VOL. XX NEW YORK—THURSDAY, MAY 27, 1909—CHICAGO No. 21

THE AUTOMOBILE

IN TWO DAYS, FROM NORRISTOWN, PA., TO HAGERSTOWN, MD., AND BACK—373.9 MILES

BY G. M. SCHELL

Near Chambersburg, Pa., Where Horses Are Still Receiving Automobile Education—American Leading the Procession.

NORRISTOWN, PA., May 24—Popularity of automobile endurance contests, when the components include a beautiful and interesting course, a good system of computing the abilities of the participants, and a classification which invites the private owner as well as the trade to join, gave last Tuesday and Wednesday, May 18-19, the occasion being the second annual touring event of the Norristown Automobile Club one of the largest lists of any affair of its kind ever held. Fifty cars left this city for picturesque Hagerstown, in Maryland, a distance of 168.1 miles, on the outbound route, and 205.8 on the return. The rules for the manufacturers' and dealers' classes made the test a rigorous one, for it included a time schedule for these classes and the contestants not affiliated with the trade, so that with the technical examination at the conclusion definite winners were secured. T. Warren Berger in his six-cylinder Oldsmobile tourabout and Frank H. Yerger in a Studebaker roadster have been announced as capturing the honors in their respective classes of the real endurance run with the critical inspection, while in the class for club members, who had to keep to a time schedule only, there is a four-cornered tie between George Parker's American, P. V. Hoy's Pierce-Arrow, Frank Hardart, Jr.'s, Elmore, and J. Elwood Lee's Cadillac. Of the non-contestants, there were ten, and as each one of these finished in good form, satisfactory to the judges, it was given a certificate of perfect performance.

SUMMARY OF NORRISTOWN RUN.

No.	Car.	Class.	Driver.	Points Lost.
2.	Oldsmobile	A-1	T. W. Berger	.2
24.	Studebaker	B	F. H. Yerger	4.4
32.	American	A-2	G. P. Parker	0*
33.	Pierce-Arrow	A-2	P. V. Hoy	0*
40.	Elmore	A-2	F. Hardart, Jr.	0*
41.	Cadillac	A-2	J. E. Lee	0*

*Not examined technically.

The road conditions were such as to furnish a thorough trial of the automobiles, and the method of arranging the schedule one which made it imperative for the drivers to run more consistently than many are accustomed to doing. Fine State pikes, good but dusty country roads, rough mountain paths, and plenty of climbing over the Blue Ridge mountains featured the route to the famous Maryland town, and valleys whose roads abound in waterbreaks were traversed on the return. The average speed required was either the maximum allowed under the

Matheson Third in the Big Class.

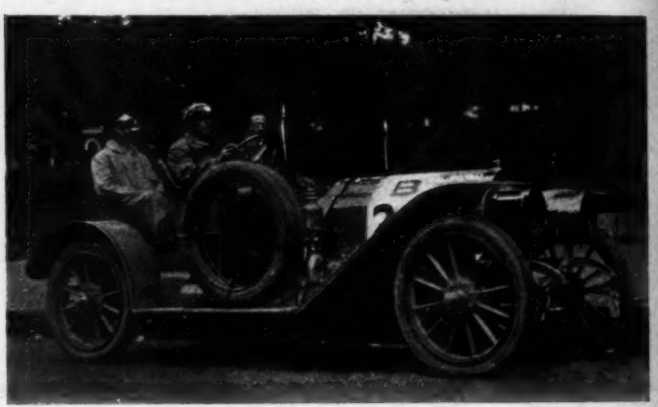
law, or very nearly that; and, in addition, there was the stipulation that the drivers were allowed not more than ten minutes' leeway between each control, the remainder of the time being taken up in actually moving forward. This prevented racing, and towards the end of each control very often necessitated a snail's pace. Dry weather favored the contestants, for in many places the roads were such as would have been well nigh impassable had there been rain.

Nineteen perfect scores were held at the completion of the first

Franklin a Close Second in Class A.

lap out of the thirty-one in the time contesting classes in the morning. Five were eliminated from this list on the second day, so that when the event ended in this city there were eight tied in the main class for touring cars or tourabouts, two among the runabouts or roadsters, and the four in the club members' contesting division. The technical examination was sufficient to make a decided change, however, giving the Oldsmobile the Block trophy, the Studebaker the Club trophy, and the four who claimed equal title to the Contestant's Club trophy arranged to leave it in the custody of the club, with the proposition of competing again for it in the annual contest next year.

Although the technical committee had decided to make no announcements as to the nature of the technical penalties, it became known that the .2 of a point imposed upon Berger was for a loose chassis bolt; that the 4.4 demerits set against Yerger were for loose cylinder nuts and pan bolts; that the 2.1 against Carris, who took second place among the touring cars, was for loose spring clips, leaky sight feed, and a loose chassis nut. A slight looseness of the steering wheel gave Hall's Matheson 4.2 points, putting it in third place, and a loose crackcase bolt and a loose steering connection sufficed to give the Interstate 28.8 and fifth position. Harry Walls' Oldsmobile passed an excellent examination, being penalized only 6.7 points, but a road mark lowered its standing. Of the enormous total of 300.4 against W. T. Taylor's six-cylinder Oldsmobile, all but .4 of a point



Studebaker Which Captured Class B.

was registered against him for having lost his acetylene gas tank. It was picked up on a long hill below Pottstown and traced to his car in the examination.

Walter M. Cram, whose Mitchell "30" was the only other clean score in addition to the Studebaker among the runabouts, was penalized 37.1 points mainly for a damaged rumble seat and a loose steering connection. Crawford's 18-horsepower Franklin in the same class had 18.6 points against it, but a road penalty put it into third place. A special contest between Van Peacock, driving Perry Gresh's 15-horsepower Ford, and Joseph Graham, in his own car of the same make and model, was declared a draw, for both cars made the run on time and without adjustments of any kind.

En Route to Hagerstown Over the National Pike.

Scenic beauties of the trip had been talked of as much as had the contesting nature, so that the tourists had an additional interest on the run through the southeastern part of the State, skirting the Hundred Mile Woods, in which Washington and his Continental army spent a gloomy winter; then through the fertile Lancaster valley, considered to be one of the richest sections of the nation; bending southward after crossing the long bridge over the Susquehanna at Columbia; through York, civil war country around Gettysburg, right into and over the mountains which had been sighted long before, and finally dropping right into Hagerstown for the night. There was the usual tale of road experiences to be heard, for enough had happened to cause the fading away of a dozen clean record possibilities. A.

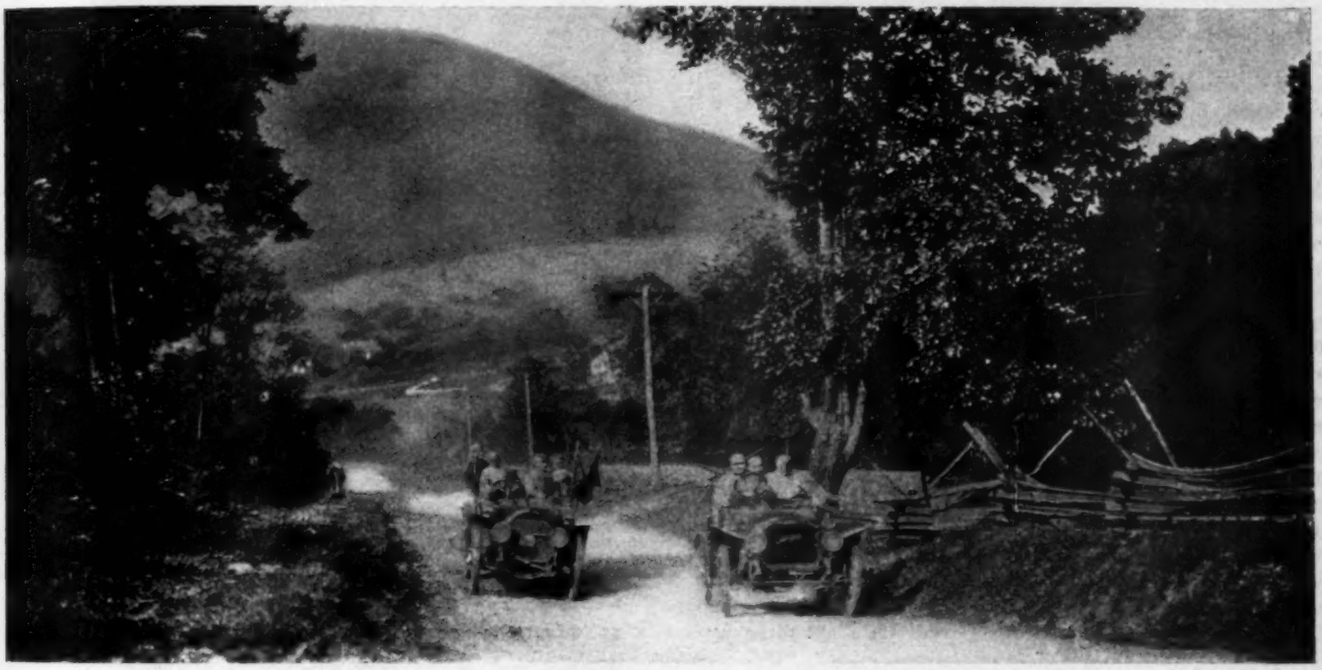
LaRoche headed the list in T. W. Twining's Regal, which struck one of the many bad ruts near York and snapped a front spring, an occurrence that is not uncommon to the autoists of that section, and thirty miles further on the other front one went down under the extra strain. A fence rail and a sledge hammer improvised a repair that enabled the Regal to reach all but the last control on time, and during the night a new set of springs were procured, so that the car finished the run on Wednesday without further mishap as a non-contestant. Taylor, in the Oldsmobile, ran out of gasoline in the mountains, a mile and a half from nowhere, and 43 points penalty piled up. The Kissel-Kar lost 29 points, 18 of which was for time lost in consequence of the motor's stalling on a sharp up-grade. Five marks were placed against the midland.

Class B for roadsters and runabouts driven by manufacturers' representatives had a number of its contestants scored upon. The little Maxwell Junior, which made a 3,000-mile non-stop run around Philadelphia during the winter, suffered greatly from tire trouble and caused the contest committee much consternation when it was found that the observer had mixed up his records, and it was necessary to give its score as incomplete. It was driven by W. C. Longstreth. The scores of the two Middleby cars were also listed as incomplete. The Brush single-cylinder runabout, the lowest-powered in the run, driven by D. T. Busse, had to stop at Hanover for seven hours because of a loose connecting rod bearing, but a new one was secured from York. Then the road through the mountains was lost and the car reached Hagerstown just in time for breakfast and to check out on the second day's run. There were loud calls for a more rigorous schedule for the return trip at the meeting of the contestants after the arrival at Hagerstown, and it was decided that the maximum should be given for the run to Norristown.

The checking stations on the outward bound run were established as follows, with the distance between each: Norristown to Coatesville, 29.4 miles; Lancaster, 27; York, 24.4; Hanover, 21.5; Frederick, 39.3; Hagerstown, 26.5; total, 168.1 miles. The running time for division I cars was 8 hours and 33 minutes, and for division II cars was 9 hours and 42 minutes.

Return Through Harrisburg and Famous Valleys.

With prospects for a run of 205.8 miles before them the contestants were lined up at an early hour for the return trip. Again there was scenery ahead which made the run well worth while, if for no other reason, through the battlefield of Gettysburg, then up the famous Cumberland valley to the State capital, and across from the Susquehanna valley to the Schuylkill at Reading, thence to the finish. Inasmuch as Hagerstown is right in the heart of the Blue Ridge, it was necessary to do some steep climbing to get out of it. Jack's Mountain was the first encountered, and it was so near the start that a number of the second division cars with a comparatively easy schedule blocked the contestants in the first section who had not gotten an early start, and were wanting to make up time. The beautiful Cumberland valley was nearly obscured to the tourists because of the heavy pall of dust raised by the caravan, varying in color from white to red, to gray, or brown, depending upon the color of the roads, and the cloud was so nearly impenetrable that one machine could hardly get near enough to another to pass with safety. From the capital to the Berks county metropolis, Reading, the run was just a pleasant amble, and the result was that the party reached that city in a bunch.



Route Had Scenery in Profusion—Mitchell Second in Class B Passing the Committee Car.

There was a surprise in store for them, however, in the route between Reading and Pottstown, for the usual one was not followed, and in its stead the cars were taken down through Birdsboro, along the banks of the Schuylkill and of a canal. The road wound around the latter so much, and so many times crossing on short bridges high up in the air, with sharp approaches and still steeper descents, that for a time drivers were worried.

The only accident of the trip occurred to the Kissel Kar soon after leaving the Harrisburg control, when it had a collision with a wagon and a steering knuckle was broken. The driver, W. H. Rodgers, observer Kirkbride and passenger Aschenfelter were thrown out, and Kirkbride lost several teeth, while the others were badly shaken and bruised. They were attended to by the Red Cross party in Paul Huyette's Peerless. W. J. Sprankle's Fiat was one of the first to suffer, a rear axle breaking on Jack's Mountain, causing the withdrawal of the machine from the contest. The four-cylinder Oldsmobile, driven by Walls, had carbureter trouble, which made it late at several controls; and the six-cylinder Oldsmobile, driven by Taylor, lost its gas tank, which told its tale later, although the car had a clean record for the day. The little Maxwell, driven by Longstreth, had another succession of tire troubles, and, with eight punctures, it was seriously delayed several times. The last five miles were finished on one rim and the machine withdrawn. The Midland, Franklin runabout, two Middlebys, and Pope-Toledo were penalized.

Elmore, One of Tied Four in Club Trophy.

Incomplete scores were given to Detweiler's Overland, Ballard's Franklin, and Miller's Chalmers-Detroit. These were caused mainly by the inexperience of observers, and were considered by many as real reasons for the adoption of rules which would penalize the car appointing the observers rather than the machines in which they rode. The Mitchell driven by Jacob Beideman butted into a curb while maneuvering for the start in the morning and broke a steering cross rod. The car was withdrawn.

The checking stations and distances of the second day were: Hagerstown to Gettysburg, 35.4 miles; Chambersburg, 24.9; Harrisburg, 51.8; Reading, 54.7; Pottstown, 18.5; Norristown, 20.5; total, 205.8 miles. The running time for division I was 10 hours and 20 minutes, and for division II was 11 hours and 45 minutes.

The technical committee took the division I cars in charge as soon as they checked in for the examination, and this was completed on Friday, when the results were compiled and the winners announced. An interesting feature in connection with the trend towards larger wheels was seen in the tire conditions of the winning Oldsmobile, with 42-inch Goodrich tires. These were used throughout the recent grueling test of the Harrisburg club and had covered a large mileage previous to that, and then previous to this one, but the car went through both events without touching the tires, and the shoes do not seem a bit the worst for the wear.

Many women participated in the run, among them being Mrs. J. S. Rex, Mrs. L. E. Taubel, Mrs. S. E. Ballard, Mrs. William Mogee, Mrs. J. F. Boyer, Miss Skillman, and Mrs. Crissman. Lunch was given to the tourists by the Motor Club of Harrisburg and appreciated by the entire party. At Hershey, thirteen miles east of Harrisburg, the cars were pelted with boxes of Hershey chocolate.

The official cars were donated by the following: Pilot, Winton, A. E. Maltby; referee, American, Stoyle-Vogel Auto Company; red cross, Peerless, P. B. Huyette; starter, Matheson, W. W. Davis; checkers, Autocar, Autocar Company; press, Locomobile, S. deB. Keim.

Reading's Club Generously Supplied Refreshments.

SUMMARY OF ROAD AND TECHNICAL PENALTIES.

CLASS A—DIVISION I—TOURING CARS—Block Trophy.

No.	Car.	H.P.	Cyl.	Driver.	Road Penalties. 1st Day.	2d Day.	Tech'l	Total.
2.	Oldsmobile	60	6	T. W. Berger	0	0	.2	.2
13.	Franklin	28	4	C. S. Carris	0	0	2.1	2.1
14.	Matheson	50	4	A. D. Hall	0	0	4.2	4.2
3.	American	50	4	Samuel Truitt	0	0	26.7	26.7
5.	Inter-State	35	4	D. F. Templeton, Jr.	0	0	28.8	28.8
10.	Cadillac	30	4	F. L. Paxon	0	0	30.4	30.4
12.	Buick	30	4	C. W. Mann	0	0	37.8	37.8
9.	Oldsmobile	36	4	H. E. Walls	0	39	6.7	45.7
4.	Midland	35	4	E. O. Hayes	5	11	34.6	50.6
7.	Jackson	30	4	W. J. Hayes	0	0	100.0	100.0
8.	Oldsmobile	60	6	W. T. Taylor	43	0	300.4	343.4
6.	Fiat	45	4	W. J. Sprankle	0	Withdrawn.		
11.	KisselKar	40	4	W. H. Rodgers	29	Withdrawn.		
1.	Regal	30	4	A. La Roche	Out first day, broken spring—continued.			

CLASS B—ROADSTERS AND RUNABOUTS—Club Trophy.

24.	Studebaker	40	4	Frank Yerger	0	0	4.4	4.4
22.	Mitchell	30	4	Walter Cram	0	0	37.1	37.1
23.	Franklin	18	4	W. Crawford	0	42	18.6	60.6
27.	Middleby	28	4	E. Smith	Incomp.	48	87.6	135.6
25.	Middleby	25	4	H. L. McCullough.	"	97	98.8	195.8
26.	Brush	7	1	D. T. Busse	Broke down first day, but continued after repairs.			
21.	Maxwell	10	2	W. C. Longstreth.	Incomp.	Withdrew.		

CLASS A—DIVISION II—Contestant's Club Trophy.

32.	American	50	4	George Parker	0	0	*	0
33.	Pierce-Arrow	50	4	P. V. Hoy	0	0	*	0
40.	Elmore	35	4	Fk. Hardart, Jr.	0	0	*	0
41.	Cadillac	30	4	J. Elwood Lee	0	0	*	0
37.	Pope-Toledo	50	4	Alan Wood, 3d	..	97	...	97
38.	Mitchell	40	4	J. Beideman	0	Withdrawn.		
39.	Overland	30	4	W. H. Detweiler	Incomplete.			
43.	Franklin	24	4	S. E. Ballard	Incomplete.			
45.	Chalmers-Det.	28	4	W. G. Miller	Incomplete.			
35.	Crawford	30	4	A. H. Roop	Withdrawn at Hagerstown.			

* Not examined technically.

CLASS B—NON-CONTESTANTS' CERTIFICATES.

51.	Mitchell	30	4	R. A. Jackson	Perfect.
52.	Overland	40	4	J. Frank Boyer	Perfect.
53.	Buick	18	4	Tom Smith	Perfect.
54.	Overland	30	4	Frank Heavener	Perfect.
55.	Buick	30	4	F. Hamill	Perfect.
56.	Locomobile	40	4	H. Beideman	Perfect.
57.	Locomobile	35	4	Jos. Coulston	Perfect.
58.	Ford	15	4	J. N. Cassell	Perfect.
59.	Ford	15	4	H. K. Kalas	Perfect.
60.	Overland	30	4	W. G. Dyer	Perfect.
61.	Autocar	28	4	Sewell Crissman	Perfect.

MATHESON GETS WASHINGTON'S BIG PRIZE.

WASHINGTON, D. C., May 22—No. 13 Matheson, entered by William Orme and driven by W. B. McBurney, one of the Matheson factory experts, has been declared the winner of Class A in the reliability contest of the Automobile Club of Washington, held May 15. At the conclusion of the run, No. 4 Packard was declared by the technical committee to have finished with a perfect technical and road score. Against this decision a protest was filed, making certain allegations, one of which was that the driver of the Packard had to do some work on his car before he was able to start it. This protest was heard by the technical committee and resulted in four points being marked against the Packard for carbureter trouble. This decision was unsatisfactory to the entrant of the No. 13 Matheson, and he protested to the American Automobile Association.

Subsequently the Packard was withdrawn by its entrant, the Luttrell company. The protest of Mr. Orme, filed with the A.A.A., was thereupon withdrawn, and the Class A Trophy was officially given to the Matheson. The mix-up relative to the winner of the top-notch class has caused considerable hard feeling, but it is believed this will be overcome in time.

Wrights Will Fly at White House—In connection with the exercises incident to the presentation of the Aero Club of America gold medals to the Wright brothers, it is possible that they will consent to giving one or two flights on the White House grounds on that date, June 10. The aviators have signified their willingness.

CHICAGO, May 24—Progress in the promotion of the two road races of the Chicago Automobile Club—for the Cobe cup and the Indiana trophy—is rapid, and there is every reason to believe the events of June 18 and 19 will be huge successes. Rules were completed last week, the Lewis company is hurrying to complete the work of resurfacing the course; Colonel Sanborn has mapped out his plans for the policing of the circuit with the First Regiment of the Illinois National Guard; the sale of seats, which was thrown open to the public this morning, is good; President Cobe has received a wash drawing of his trophy, and the entries give promise of big fields.

Up to this morning there had been received in all nineteen entries, of which nine are Cobe cup candidates and ten are in the curtain-raiser. The last to come in was an Apperson Jackrabbit, nominated by Edgard Apperson, who names Herbert Lytle for driver. This is one of the two that will run for the Kokomo concern, it being the intention to make the other nomination at the end of the week. The Apperson goes on the same tab that already includes three Buicks, to be driven by Strang, Chevrolet and Burman; two Knoxes, to be driven by Denison and Bourque; two Stoddard-Daytons, with Miller and Englebeck up; and a Fiat put in by E. A. Hearne, who intends driving himself. In addition there are expected a couple of Locomobiles, and perhaps a Thomas little six. Two more Fiats are possibilities. No new entries have been received for the light car event since the two Chalmers-Detroits were turned in last week, but it is expected that a Corbin and a pair of Locomobiles will come to hand before the lists close. The ten in now are the two Chalmers-Detroits, two Stoddard-Daytons, three Buicks, two Marions, and a Moon.

Visitors to Crown Point yesterday found that the work of scraping the circuit has been nearly completed. The new stretch on the north leg is ready for rolling, while three miles of the east leg has been completed. In all, seven miles are ready, except that four miles must be rolled. This is on the east leg, and also on the stretch between Crown Point and Cedar Lake. There are two gangs of men at work. The one fixing the road includes thirty teams and thirty helpers, while in the taroid gang are twenty teams and fifteen helpers. In addition there are two scrapers, two steam rollers and a sweeper.

Colonel Sanborn figures out it will take 800 members of the First regiment to patrol the course, and in his plans he calculates on dividing the circuit up into three zones, in which there will be forty-one stations. In the first zone stations 1 to 9 will be included, and also No. 41. A major will be in command and the section will include the grand stand site and also the congested streets of the town of Crown Point. Three hundred men will be needed for this one zone. As many more will be required in the second zone, which will include the district in and about Lowell, with a major in charge. In the third zone the Cedar Lake district will be included, while the other stations will be in the country, the district being divided so that each squad will include eight men in charge of an officer.

The regiment will be moved to Crown Point the night of June 17 and will pitch its camp in the rear of the grand stand. There the soldiers will live during the meet, and it is expected they will add a picturesque touch to the landscape. Each morning they will be distributed at their stations by means of motor trucks, which General Executive Trego is securing for the purpose. Also there will be half a dozen motor ambulances.

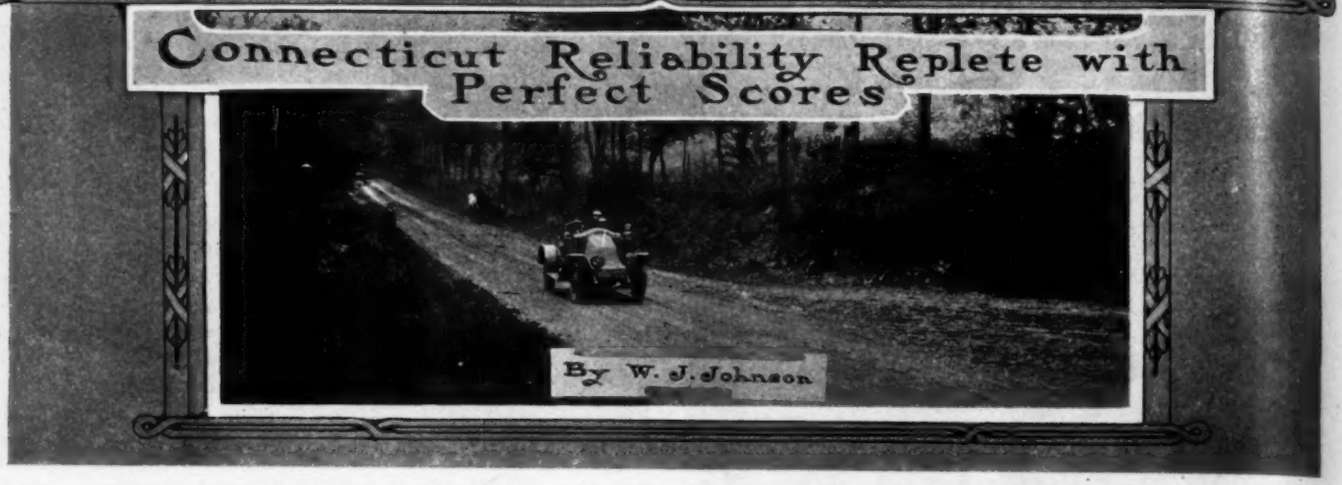
The Cobe trophy, a design for which has just been shown, is of an unique nature. It will stand 39½ inches and be of sterling silver. The base is to be of malachite marble, which in turn stands on an ebony base. The base consists of a convoluted section of Ionic design, surrounded by miniature winged motor-car wheels, sprinkled with sprigs of laurel and oak. Ionic plates with appropriate wording appear on the front and reverse of the trophy, one bearing the inscription, "The Cobe Trophy, Western Stock Chassis Race," and the other being left blank for the names of the winners. Above the broad frieze which surmounts the base is an allegorical depictment of the Spirit of Speed, which includes the nude figure of a woman with wind-blown hair, seemingly gliding through space. Her left hand rests lightly on the surface of the urn, while her right arm is outstretched to cleave the air before her. Swallows, with wings outspread, accompany her. Below the mouth of the urn is a circlet of laurel leaves.

Prominent Drivers for Fal-Cars.

CHICAGO, May 24—With the nomination of two Fal-Cars for the stock chassis race in connection with the carnival to be held on the Crown Point, Indiana, course, two drivers of prominence have been added to the lists. E. M. Harrison, who has raced Darracq, DeDietrich, and Mercedes cars in famous English and Scotch races, will be at the wheel of one of the Fal-Cars, and A. H. Pearce, who was well known as a driver of Pullman cars, will have the other. Both Pearce and Harrison are now familiarizing themselves with the circuit and preparing their racing cars. H. R. Averill, the sales manager, has outlined a policy which will keep the new cars before the public.

President Ira M. Cobe of the Chicago Automobile Club.

Connecticut Reliability Replete with Perfect Scores



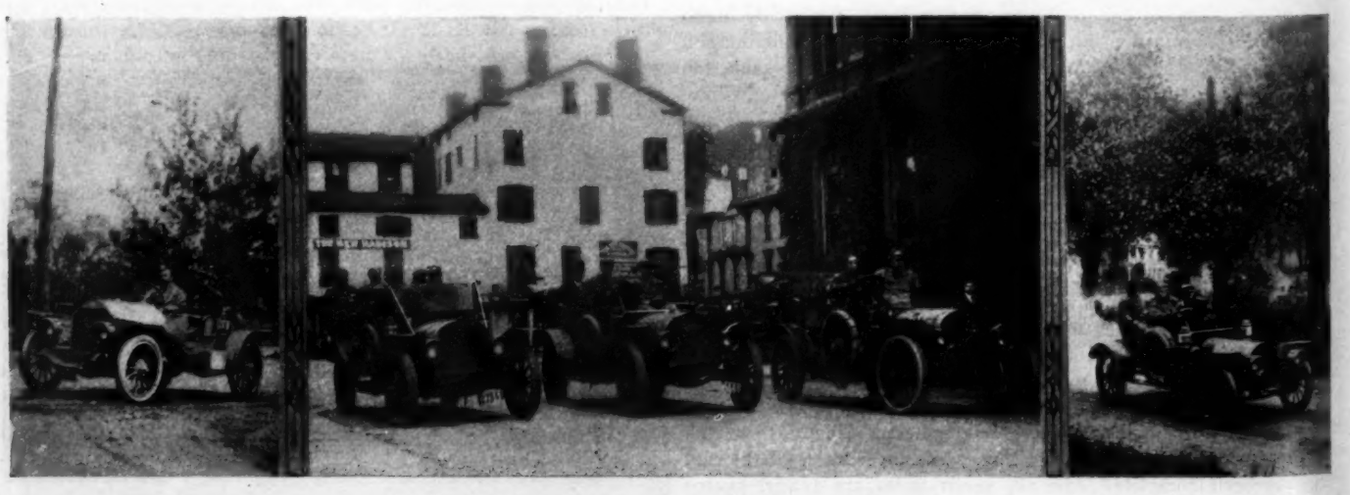
Renault Perfect Score Leading the Procession on the Beautiful Connecticut Highway.

HARTFORD, CONN., May 24—Reliability is a term well revered and understood in the central part of the Nutmeg State since the second annual endurance or reliability contest of the Automobile Club of Hartford. The hope of securing definite winners in each of the five classes had led the club to select a course of 213 miles which was considered hard enough to eliminate the usual preponderance of perfect scores, but the reliability of the 26 starting autos was a point previously underrated, for 15 finished with their records clean and there was a winner in but two of the divisions, those for the very smallest runabouts and for the very largest and most expensive.

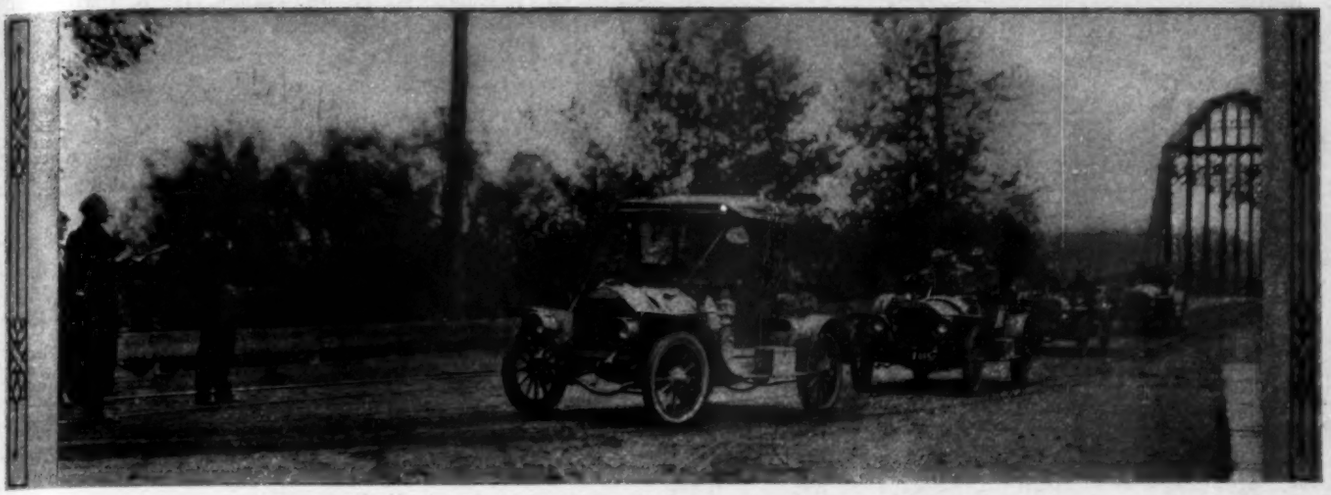
Road and weather conditions combined in furnishing a test of real merit, and the drivers will testify as to its rigidity, but nevertheless there was a tie of unusual proportions when the event was completed in the dust of a dismal evening. Outlining in their course the figure of a four-leaf clover, the contestants were sent out of this city four times, each in a different direction, and were sent far enough away to give them all kinds of Connecticut highways, from the fine ones constructed by the State to the poor country roads yet unimproved, and each time bringing them back to the capital so that the interest in this city might be increased five-fold. Rain throughout the trip made traveling rather disagreeable and necessarily more difficult over a route considered strenuous even in dry seasons. These features, therefore, made it all the more of a surprise that there was not a dearth of the clean score genera.

Conducted under the A.A.A. rules, the cars were divided by their selling price, and a running time of ten hours given to the largest entrants, with that for the others arranged upon a handicap basis, so that the average speed required was between 17 and 20 miles an hour. There was a schedule of penalties for road work and for stalling of motors, but there was no technical examination—this not being thought necessary when the route was decided upon. The list of contestants was one that included well-known makes of American cars and one foreign representative. Yet of all there were just two definite winners after the run was concluded, a little Maxwell Junior obtaining an unqualified hold upon its class, for it started with one competitor and finished with none; and the other was the Renault, which captured Class A. The cars which had perfect scores were: Three Ramblers, two Chalmers-Detroit, two Buicks, Maxwell, Knox, Renault, American,. Stoddard-Dayton, Franklin, Corbin, Inter-State. The Inter-State has been protested.

A distance of 45 miles was provided for the first lap, passing through New Britain, Meriden, over Southington Mountain, Plainfield and Farmington. By the time that the last-mentioned city was reached the cars had strung out into a line and continued throughout the day, only once in a while getting bunched, for the rules were such that the contestants had to keep pretty well to each individual schedule. Southington Mountain was expected to furnish the first excitement of the day, but it was easy, for the road had been improved, and, in fact, the only poor road of the distance was at the entrance to Farmington, where the ooze was deep. All checked in and were sent away on a run of 57 miles, this time to the northeast, through Manchester, Rockville, West Stafford, Windsor Locks and Windsor. Macadam, sand and clay roads were met with in order and then varied after the first few miles were covered with the



Stoddard-Dayton Checking. The Trio of Ramblers That Made Perfect Scores. Six-Cylinder Franklin.



Dennison's Knox, Mertens' Columbia, Goss' Corbin (Perfect) and Reid's Columbia.

mud giving the excitement, for the constant rain had no effect upon the sand. Hartford was made a noon control with a stop for lunch and a chance to take account of stock. In the second control at Enfield the Hon. H. R. Coffin's Columbia, driven by Mertens, was penalized for stopping its motor when it ran out of gasoline and having to renew its supply away from the control. Bourque in a Knox and Lorimer in a Chalmers-Detroit each changed a tire apiece during the morning, but there was a noticeable absence of the autoists' bugbear during the day. Another car joined the party at the completion of the first round, a Jackson, driven by E. L. Lazarro, which should have started with the other contestants. The car was sent around the three remaining laps, but was given no standing, although it made a perfect run at that distance.

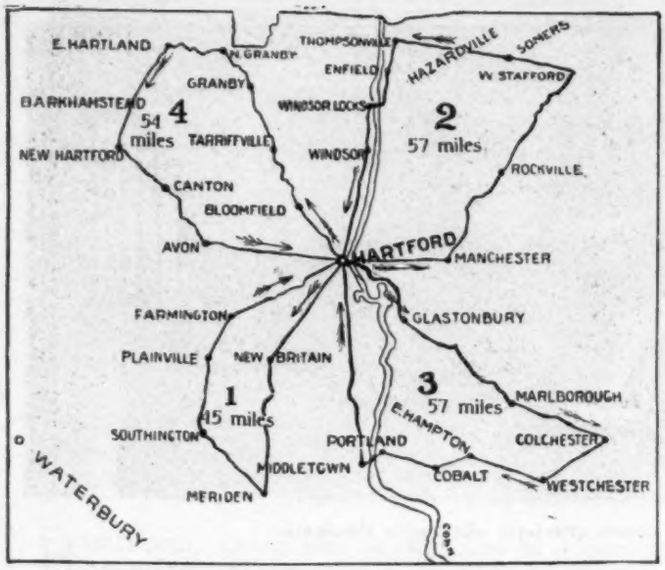
The real endurance run of the trip was that of the afternoon, through two laps, the first of which was to Glastonbury, Marlborough, Colchester, Portland and Middletown, a distance of another 57 miles. The rain had made the thirteen Colchester hills very slippery and the whole run was a harder one than those of the morning. As far as Glastonbury there was macadam, but after that sand and clay put forth their best efforts, seemingly to impede the tourists. The little Buick, driven by Hooker, had trouble with its timer and was forced to withdraw, and Dennison accidentally stalled his motor when his foot slipped from the accelerator pedal, costing him one point. Shortly thereafter the Corbin, driven by Goss, took a notion to slide around inasmuch as there were no chains upon its tires, and after twice considering a ditching was brought up straight. Lorimer lost a point by stalling the motor of his Chalmers-Detroit and Miner's Pierce had ignition trouble which caused a halt and the loss of the clean score. The Mitchell, driven by Smith, had to make a stop for an adjustment to its oiling system and was accordingly penalized. Currier was another to stall his motor, a Columbia, showing that the road conditions bothered even the best of operators by the number which lost control for a moment. A detour was necessary at Rocky Hill, where a new State highway is being built, and the dirt road was used, but it caused no material inconvenience.

"Last, but not least," was the characterization of the fourth lap, one of 54 miles length, taking in the towns of Bloomfield, Tariffville, Granby, New Hartford and Talcott Mountain. The beautiful scenes along the route seemed to be a mockery when looked upon as compared to the road, for after the macadam at Bloomfield was left the cars dropped to the hubs in soft mire. The town authorities had made this worse by recently paring off the edges and throwing the loose turf into the center. The result was that the first car through plowed two deep furrows which every one had to follow, and the tracks grew still deeper until the axles began to level them off. Both men and machines took on a coating of mud, but all pulled through safely in spite of an up-grade a mile and a half long. There was a repetition or troubles, the same ones which were delayed on the third lap, because of deranged ignition or lubricating systems, having to stop on the fourth. Talcott Mountain was a feature of the last part of the day, for the fog was so thick that it was impossible to see more than 100 feet ahead, both on the ascent and then on the coast down into the Connecticut Valley. Reid's Columbia broke an oil valve on the base of his crank case, necessitating a

Rankin's Chalmers Checking.

Harry Hart in His Perfect Score American.

Pierce-Arrow Checking In.



Map Showing Course that the Run Covered.

stop, and the Maxwell Junior, which was doing wonderful work, was made late by tire trouble occurring in the dark. Hart in the American and Tuttle in the Stoddard-Dayton were also delayed by having to change tires, but time was allowed for this as long as the motor was kept running. Dean Rankin in the Chalmers-Detroit led the bunch over the mountain and down into the valley and then over Avon Mountain beyond. MacDonald smashed the spokes of a wheel on his Maxwell, but finished with a perfect score, and MacCormick's Pierce was 30 seconds late at the finish, thereby penalized one point, giving the Renault the only perfect score in Class A for cars costing over $3,751. Only one car failed to finish by evening.

With 15 clean scores before them the contest committee was in a quandry and it is probable that each of this number will receive a trophy. The scores of the Inter-State, Coffin's Columbia, and for a time that of MacCormick's Pierce were in doubt. The officials of the contest were given great credit for the manner in which it was conducted and the cars and drivers for having made such a hard trip so successfully. The officials were: Referee, A. L. Riker, Bridgeport, Conn.; timer, Albert M. Kohn; assistant timers, C. D. Alton, Jr., E. J. Manning, C. E. Whitney, J. H. Freeman, E. S. Edwards, G. E. Kohn; starter, W. C. Russell; superintendent of observers, A. G. Hinkley; superintendent of checkers, A. E. Woodford; checkers, E. A. Atkins, M. T. Russell, R. F. Gibbs, W. H. McLaughlin, W. B. Carroll and L. D. Hart. The following is the official summary:

CLASS A—CARS LISTING AT $3,751 and UPWARDS.

No.	Car.	H.P.	Driver.	Penalty.	
26.	Renault	30	C. E. Sykes	0	
27.	Pierce	30	R. H. MacCormick	1	Late at Hartford, 1 min.
28.	Pierce	45	S. A. Miner	34	Ignition troubles, 3d and 4th laps.

CLASS B—CARS LISTING AT $2,451 TO $3,750.

15.	Knox	38	Wm. Bourgue	0	
16.	American	50	H. A. Hart	0	
18.	Stoddard-Dayton	45	Harry Tuttle	0	
19.	Franklin "Six"	42	John Burns	0	
21.	Chalmers-Detroit	40	Dean Rankin	0	
24.	Corbin	30	Stanley Goss	0	
25.	Rambler	45	S. E. Campbell	0	
13.	Corbin	30	P. Corbin, Jr.	1	Stalled motor.
14.	Knox	38	A. Dennison	1	Stalled motor.
20.	Chalmers-Detroit	40	L. B. Lorimer	2	Stalled motor.
22.	Columbia	29	H. Currier	2	Stalled motor.
17.	Columbia	29	G. Mertens		Ran out of gasoline.
23.	Columbia	29	F. T. Reid		Broken oil pipe, 4th lap; withdrew.

CLASS C—CARS LISTING AT $1,751 TO $2,450.

10.	Rambler	34	E. W. Williams	0	
11.	Rambler	34	J. E. Brennan	0	
12.	Buick	24	D. C. Lull	0	

CLASS D—CARS LISTING AT $1,000 TO $1,750.

5.	Buick	22	Bob Miner	0	
6.	Maxwell	28	J. Macdonald	0	
7.	Chalmers-Detroit	30	F. F. Cameron	0	
9.	Inter-State	35	F. L. Mills	0	
8.	Mitchell	30	B. F. Smith	40	Oil troubles. Took supplies away from controls.
4.	Jackson	30	E. L. Lazarro		Ran last three laps. No score given.

CLASS E—CARS LISTING AT $999 AND UNDER.

3.	Maxwell	10	C. E. Goldthwaite.	10	Arrived late at control.
1.	Buick	18	D. C. Hooker		Timer trouble in 3d lap; withdrawn.

BALTIMORE NOW WANTS MORE CONTESTS.

BALTIMORE, May 23—So pleased are the members of the Automobile Club of Maryland and the dealers with the recent sealed bonnet contest and endurance run that there is talk of holding a three days' endurance run and possibly a 24-hour race within the next month. A private contest is being talked of between the 28-horsepower Franklin and the 40-horsepower Studebaker, both of which finished with perfect scores in the club run. A substantial side bet may be made and the route spoken of is from Baltimore to Pittsburg and return. The Winton "48" and the Packard "30" which ended on even terms, each with a penalization of two points, are likely to get together in consequence of the rivalry that has cropped up since the contest. Another possibility involves the Gaeth and the Stoddard-Dayton.

Mill's Inter-State. **Committee of the Hartford Automobile Club.** **McDonald's Maxwell.**

W. T. Fenn, president; Arthur G. Hinkley, secretary; Thomas C. Russell, vice-president; W. C. Russell, C. H. Gillette, W. F. Plimpton, A. M. Kohn, A. D. Altan, and E. S. Edwards, contest committee.

Automobile Gasoline and Other Available Fuel

Part VII

By Thos. J. Fay

CALCULATIONS for compression rarely accord with the actual compression in practice, due in a large measure to a mass of variables that cannot well be reduced to definite values. In the first place, it is very difficult to fix upon the initial pressure, p, which would be 14.7 (nearly) pounds per square inch, were the mixture to enter the cylinders without the aid of a vacuum. Suction is a necessity under the conditions that must obtain if carbureters are used of the class in which a float is present to regulate the flow of gasoline, or if any other method is employed involving piston displacement in the process of inspirating the mixture.

The absolute compression in pounds per square inch will be more or less depending upon the initial pressure, as well as upon the clearance volume in per cent. The curve, Fig. 34, shows the relation between clearance volume in per cent. and absolute pressure in pounds per square inch, taking the exponent "N" as equal to 1.3, in which there is a good chance for error, due to the difficulty involved in calculating for this value.

Exponent "N" Valuable in the Process of Determining Compression—The numerical value of the exponent "N" has been variously stated by the several authorities between 1.20 and 1.40, which difference is enough to assure that the results of calculation will be of small avail in practice. In any case the value of the exponent "N" will depend upon the speed of a motor and as a result it is only possible to calculate for clearance space on a basis, taking into account some one speed. What the clearance space ought to be then is a subject that will remain in the land of speculation to a vast extent, although it will be possible to approximate the same at some one speed of a motor. To find the actual clearance of a finished motor the method long ago adopted by marine engineers will be the most exact, in which the whole space is filled with water and the weight of water required is then ascertained. The water is then spilled out down to the level in the cylinder representing the top of the stroke and the weight of water in the clearance space is then compared with the weight of water left in the cylinder, which latter amount represents the cubical volume due to the sweep of the piston.

In designing cylinders, if they are not too irregular it is possible to calculate the respective volumes with a fair amount of accuracy, but all such calculations should be checked by the water displacement method before the calculations are accepted as final. This will, of course, put a nick in the store of conceit of the average designer, but it is better to do so than to have a large number of motors on the market in which quality is conspicuous for its absence. With a view to showing something of the ills that will follow errors in calculating clearance it is but necessary to assume a case. If preignition is eminent in a motor at an absolute compression of, say, 100 pounds per square inch, which is a matter depending, (a) upon the completeness of scavenging, (b) the quality of the gasoline, (c) temperature of the motor, (d) various design features of the motor. The curve, Fig. 34, shows that 100 pounds per square inch, absolute compression, will be the result when the clearance is about 20 per cent. of the total volume of a cylinder. Increasing the clearance by 5 per cent. will reduce the absolute compression to about 80 pounds per square inch. An error of 5 per cent. is not impossible in work of this character and if the design is to be with a very high compression, as in certain classes of motors, to run at a high speed, an error of less than 5 per cent. will lead to trouble in all probability.

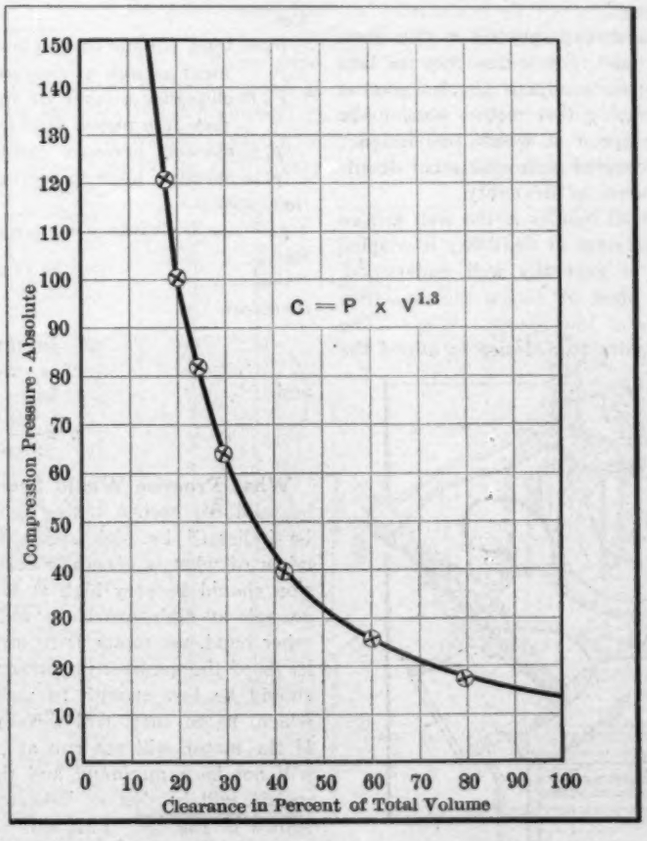


Fig. 34—Curve showing the clearance space for different values of compression when the exponent "N" equals 1.3.

Taking motors for touring service it is not uncommon to find that the clearance is even as much as 30 per cent. of the total volume and 25 per cent. is a very common figure. When the clearance is to be fixed in the cylinders of a motor it is necessary to consider the factors as follows:

(A) The bore of the cylinders because the leakage factor will change and the loss of charge due to valves and manifolds as well as ports will undergo alteration.

(B) Increasing speed demands a decrease in the clearance space for the reason that the amount of mixture that will enter reduces in weight as the speed increases hence the compression falls off and the results are not so good. Part of this need will be due to ignition trouble in that the rate of flame propagation will be retarded; brought about, to be sure, by a reduction in compression as speed increases.

(C) If the cooling is direct, as in air-cooled motors, the heat transfer is at a higher level and the weight of fuel (mixture) will be reduced due to rarefaction of the mixture so that the clearance should be decreased to compensate for the loss of weight. On the other hand, the heat being higher, the result is that the gas expands more than enough to offset the difference in weight of fuel so that the net situation represents the equivalent to an increase in the clearance space in such motors. In air-cooled work it is not impossible to consider a clearance space of 35 per cent.

(D) In very slow-speed motors, especially for motor boats and in stationary motors, the clearance space should be higher, even 40 per cent. In this class of work the question of ignition does not influence the situation at all, in that there is ample time in which to ignite the charge, and the pistons can be so long with such a number of rings

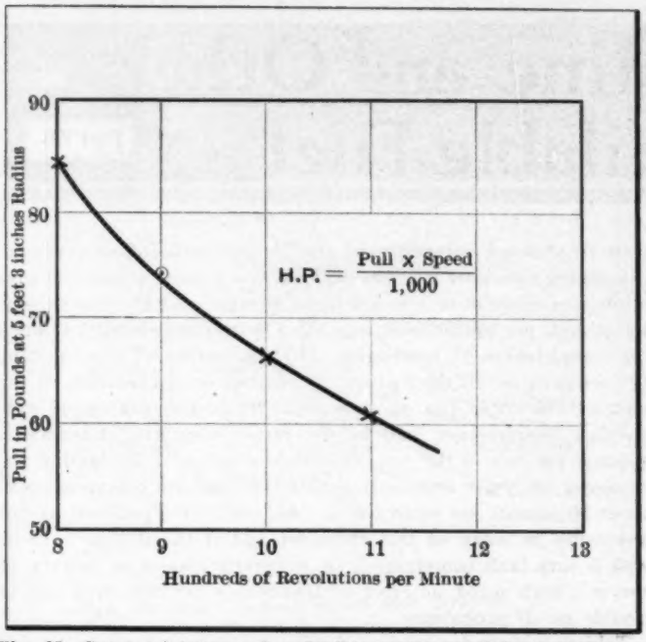


Fig. 35—Curve of torque of a flexible motor used in touring cars in which the speed is relatively low.

that leakage will not be a serious factor; moreover, there will be little or no loss in the ports, manifolds, etc.

This question of clearance space is not to be reduced to a rule that can be applied equally to all makes and sizes of motors and were it possible a means for adjusting the clearance for different speeds as well as for the several other conditions would be an advantage. True were it possible to adjust the clearance it would not be so necessary to adjust the spark under different conditions of speed. Indeed it might be quite possible to dispense with the spark changes were it easy to adjust the clearance instead, and for changing speed.

The fuel problem from all appearances is present in this question of clearance to a vast extent, and if it is true that the best results would follow were it possible to adjust the clearance as the speed changes it is equal to saying that motors have to be designed, taking into account the speed at which the designer intends to realize the most power coupled with such other details of design as will afford the maximum of flexibility.

That flexibility is not present in all motors is too well known to require proof; moreover, this question of flexibility is coupled with the compression more than is generally well understood. Take, for illustration, the larger sizes of racing motors; they are the worst kind of performers at low speeds. Why? The clearance space is much restricted, due to a desire to afford the

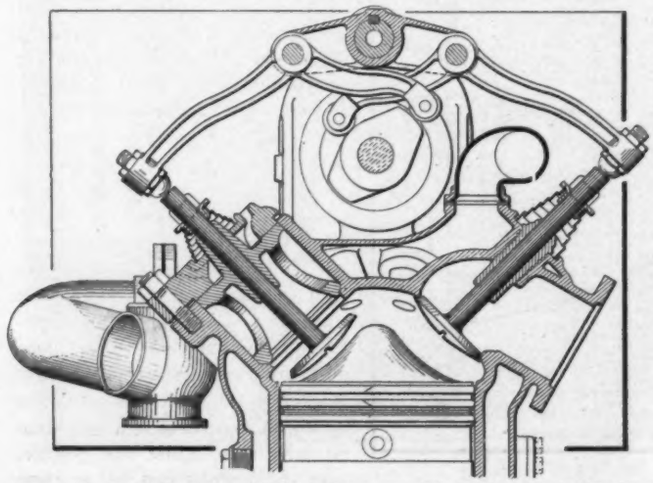


Fig. 36—Depicting a spherical dome contrived to afford the least surface and the quickest means of disposing of the exhaust.

best results from the ignition point of view at the higher speeds. The torque curve as shown in Fig. 28, plainly illustrates an increasing torque with decreasing speed, as against an increasing power with increasing speed. This is quite the reverse to what one would expect as a general proposition, although it is true that the power of a motor is maximum when speed multiplied by torque is a maximum rather than when speed or torque is the highest.

The exponent "N" should be as high as possible, all other things constant, for, as will be shown if a problem is considered, when the exponent "N" is low relatively, the density of the charge will fall off to correspond. In ordinary work it is very likely that the absolute pressure will be as low as 13 pounds per square inch (or even lower) during the suction stroke of the motor with the chance that it will not hold to this value during the whole stroke. In some cases the absolute pressure has been found to be higher, and even 14 pounds might be considered as having obtained in some cases with fine carbureters.

Increasing speed should reduce the absolute pressure during the suction stroke, and if this is true, it is then reasonable to assume that the weight efficiency of a motor will increase as the absolute pressure decreases within certain limits, which is so when the power of a motor increases as the speed increases up to a certain point, during which period the absolute pressure is on the decrease. For a given speed then the absolute pressure should hold to a maximum during the suction stroke, although it is true that the power will be higher if the speed is increased provided the torque does not fall off at a rate greater than the rate of increase of speed as it generally does.

Conventional Formula Involving the Exponent "N"—The exponent "N" was taken as 1.30, which is a good average value in motors if the absolute pressure is 13 pounds per square inch on the suction stroke. If the absolute pressure increases to, say, 14 pounds per square inch on the suction stroke the exponent "N" would fall off and the average value of the same might well be placed at 1.25 or slightly above. For the formula the following will hold:

Let

V_1 = total volume of a cylinder, which includes piston displacement as well as clearance volume,

V_2 = clearance volume of the cylinder, which is the total volume less piston displacement,

p_1 = absolute pressure corresponding to V_1,

p_2 = absolute pressure corresponding to V_2,

then

$pV^n = c$ = clearance in per cent. of whole volume.

and

$$p_1 V_1 = p_2 V_2,$$

therefore

$$\frac{p_1}{p_2} = \left(\frac{V_2}{V_1}\right)$$

and

$$n = \frac{\log p_1 - \log p_2}{\log V_2 - \log V_1}$$

What Practice Would Seem to Indicate—If a motor is to be used for racing, taking into account such conditions as will be indicated by high speed, in which no notice will here be taken of what is generally designated as flexibility, the compression should be very high at low speeds in order that it will be enough at high speeds to well serve the purpose. If, on the other hand, the motor is to do general service, in which flexibility is of the greatest importance, it is then that the compression should be low enough to assure a fair measure of flexibility, which, to be sure, will thwart the performance at high speed. If the motor will not run at a high speed the weight efficiency will not be a minimum and the power (on the higher level of speed) will be that as indicated by a receding torque curve, as shown in Fig. 35. That this is a good torque characteristic for motors that are to serve under ordinary conditions would seem to be true primarily because the flexibility question is in better

shape and the chances of cylinder trouble due to high strains will be reduced. In this case the power was a maximum at about 800 revolutions per minute of the motor crankshaft, which is very different from the performance of the racing motor as portrayed in the curve, Fig. 28, in which case the maximum power was at about 1,800 revolutions per minute of the crankshaft.

Power Corresponding to Torque—In view of the length of the leverarm of the Prony brake, as used in the test of the motor, the curve of which is given in Fig. 35, the formula is very readily determined in the manner as given in the curve, an example of which will be as follows:

When

$H.P.$ = actual horsepower of the motor

P = pull in pounds at 5 feet 3 inches radius = 85

S = speed of crankshaft in revolutions per minute = 800

then

$$H.P. = \frac{85 \times 800}{1{,}000} = 68 \text{ horsepower.}$$

HORSEPOWER AT DIFFERENT SPEEDS AND TORQUE VALUE

Speed.	Torque.	Speed x Torque.	Horsepower.
800	85.0	68,000	68.00
900	74.2	66,780	66.78
1,000	66.7	66,700	66.7
1,100	60.61	66.671	66.67
1,200	52.5	63,000	63.00

As the curve shows, the power is almost constant for all speeds between 800 and the maximum speed above given, and in the test it was found that the power fell away in inverse proportion as the speed decreases below 800 revolutions per minute and the power decreased as speed increased above 1,200 revolutions per minute. On the face of it there was no use in gearing this motor to run at speeds above 800 revolutions per minute and that the motor would last longer in service at 800 revolutions than it would at 1,200 revolutions is too plain to require any proof at all. The natural inference is that this motor was not well designed; this inference will be sustained by the facts provided a racing motor is in the mind's eye. Obviously this motor was designed with a relatively low compression and with valves so small that beyond a certain point the speed would not increase even with a proper fuel adjustment and with the spark timed for the best results as well as running free.

That a motor such as this would be capable of doing good work without having to place a governor to limit the speed as the load falls off (as it does when the clutch is withdrawn) is one of the points in its favor, and as to the weight efficiency, it was high enough in this case to class the motor as satisfactory on the ground that the weight efficiency was on a basis of 13.3 pounds per horsepower, which is a fair average figure, although it is true that racing motors deliver on a basis of about 10 pounds per horsepower, or even better.

Weight Efficiency Is a Matter of Design—If a motor is to last for a long time in the hands of men of no great skill it follows that the design must take all the conditions into account, and when the fuel, which is the real source of power, is to be used on a highly efficient basis, then the weight efficiency must be high and the life of the motor will be reduced accordingly. This is not a question that will involve the actual transfer of energy from the fuel, for the reason that this transfer can easily be the same in the motors of different weights under fair conditions. In this case then it is a question of the mechanical efficiency of transfer, and as a matter of fact, high weight efficiency may mean low mechanical efficiency as well as an increase in the factor of depreciation.

Designers have their choice between high weight efficiency, with its attending shortened life and lower mechanical efficiency, as against a lowered weight efficiency, increased life and, of necessity, increased weight, which may affect the final results to the extent of reducing the ultimate fuel efficiency. In the final sum-up of fuel efficiency it is a question of "ton-miles" per gallon of fuel or per pound of the same. If the motor is heavy and the car is on the same basis, it is a moral certainty that the load that the car will carry will be reduced accordingly. On the other hand, if the motor is light and the car is along the same lines, it is more than likely that the safe load on the car will be limited. In any design then, taking into account the fuel, with the idea of realizing the greatest result per pound of the same, some standard must be established such as will represent all the conditions that go to form good success.

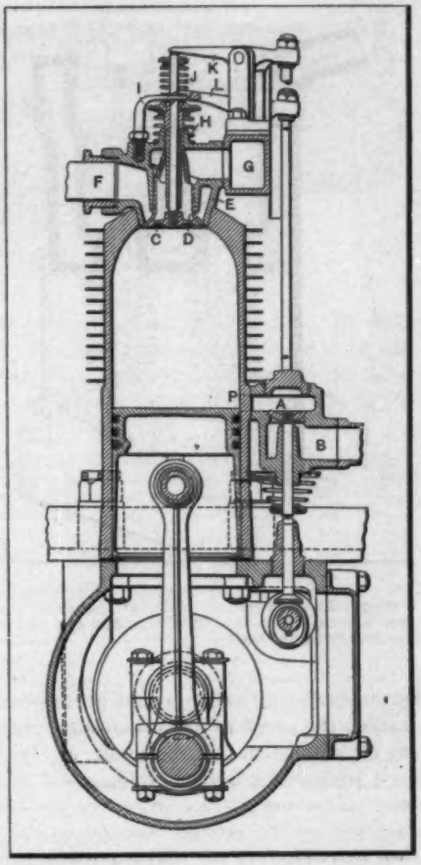


Fig. 37—Franklin air-cooled motor, presenting a spherical dome and concentric valves, as well as an auxiliary valve for the quick elimination of exhaust products.

Strike a Balance Involving a Happy Medium—In all probability the conservative course lies in a design that will embody enough weight to do the work for a long time, which time should be related to the first cost of the car as well as the actual service that it will render so that the "burden" a car will safely sustain under is an important detail to be taken into account. The actual

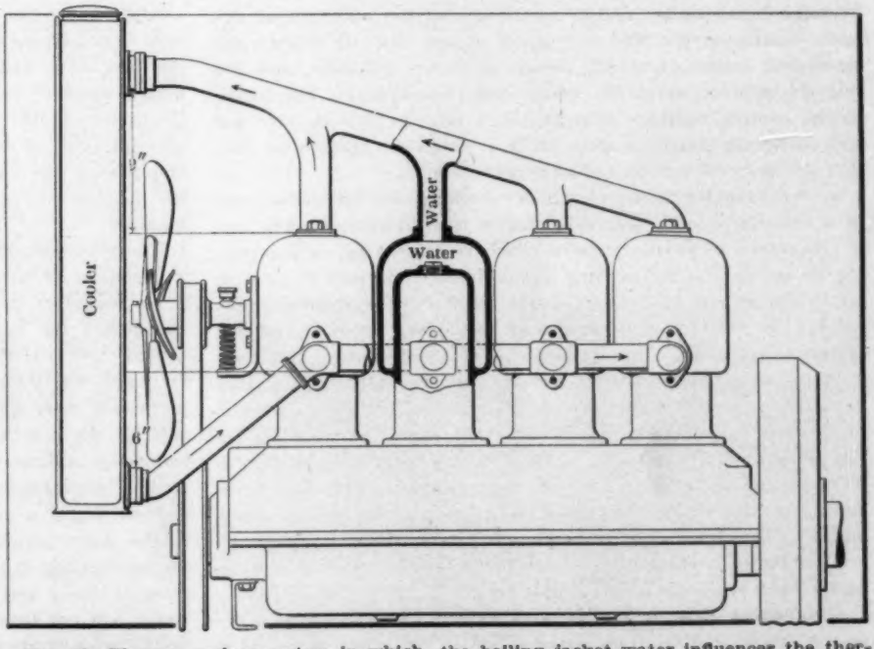


Fig. 38—Thermo-syphon system in which the boiling jacket-water influences the thermal efficiency of the motor.

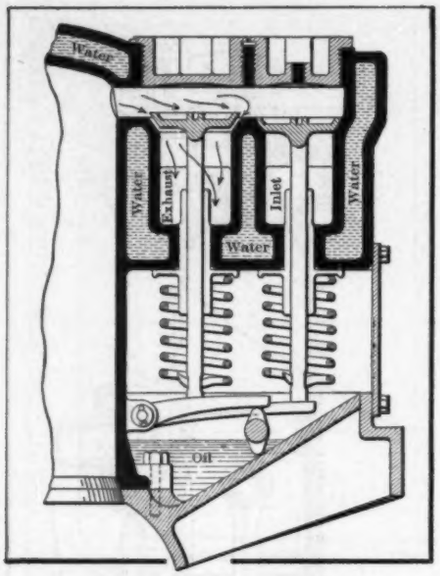


Fig. 39—Valves in lateral tandem and spark-plug over the intake, adjacent to the heated exhaust valve.

fuel efficiency of automobiles will best be known by performance under ordinary road conditions rather than as the result of special economy trials, yet even so special efforts lead to knowledge of the requirements and designers are enabled to make improvements when they know what to improve.

Some Details That Influence the Situation—Mixture alone, or even the best mixture and the most suitable compression will fall short of the requirements in the absence of other important considerations. Take, for illustration, the shape of the combustion chamber; there is no denying the contention that the results can be influenced thereby. The least surface for a given volume will be due to a spherical contour. That the surface should be the least possible is generally conceded on the ground that the losses to the water-jacket will then be reduced to the lowest possible point.

A spherical head demands the location of the valves in the head of the motor and this is probably the best reason why some very efficient racing cars are provided with motors in which the valves are in the head, one of which is illustrated in Fig. 36. In this case the piston head is probably not in accord with the rest of the design, but this is a detail outside of the main question, for the reason that the piston is not water-jacketed, and the losses to the water-jacket are not therefore involved.

The same idea is embodied in Fig. 37 of the Franklin (air-cooled) motor, only that in the Franklin the piston is in accord with the main theory and the valves are so designed that the combustion chamber is almost a true sphere. The fact that the Franklin is air-cooled makes no inroad on the accuracy of the main conclusion for the very good reason that all motors are air-cooled (some of which, direct, as in the Franklin, and the rest are indirect, as in the water-cooled examples). The losses to the cooling medium must be taken into account in any case and, as before stated, if the surface is small the amount of heat that can pass off will be reduced in consequence.

In the Franklin motor it will be observed that the valves are in a concentric nest, and referring to the illustration, Fig. 37, *A* represents an auxiliary valve which is a great aid in scavenging the motor and the exhaust leaves through the port *P*, passing off to the pipe *B* and thence to the muffler. The main exhaust valve *C* is provided with a seat by the intake valve *D* and the exhaust passes off to the manifold *G* while the intake is shown at *F*. The exhaust valve is mechanically operated by the arm *K* and the spring *J*, while the inlet valve is mechanically operated by the arm *L* and the spring *H*. The bent arm *I* serves to resist the pressure of the spring *J*. That the fine performance of the Franklin is largely due to the valves provided is assured, and the auxiliary valve is regarded as of the greatest utility in air-cooled work. The idea, while it takes into account the question of scavenging, is most important from the point of view of disposing of the heat in the shortest possible time.

Differences Due to Methods of Water Cooling—It is common to claim that the water as it is led to the water-jacket of a motor should be entered at the hottest part in order to enable the water to absorb the greatest amount of heat of which it is cable in the short time allowed. This idea is a good one up to a certain point, although it is contrary to the idea of maximum thermal efficiency because the greater the difference in heat the more will be the loss to the water-jacket. In the thermo-syphon systems the water is handled in the manner as shown in Fig. 38, and as will be observed, the boiling water is allowed to raise directly above the dome of the combustion chamber thence away to the cooler. That the water does boil and that steam does form above the combustion chamber is a matter that will be easy to prove in many cases at any rate, and that the thermal efficiency is increased thereby is a moral certainty. The thermo-syphon system is in the nature of a middle practice between the direct and the indirect methods of cooling, and since both the direct and the indirect methods work in practice there is nothing to prevent the thermo-syphon system from serving well the purpose rather with the expectation that the result will be as a happy medium between the two.

From the fuel point of view these matters have to be taken into account on the ground that it is the fuel problem that dictates the cooling rather than the mechanical problem. Lubricating oil is now to be had of a character suitable for use under the most severe conditions, from the temperature point of view, so that, as before stated, it is the fuel question that influences the major effort in the cooling problem.

Location of Spark Plugs Must Be Considered—There are two sides to this question, in that the mixture must be suitable for the purpose as well as it is true that the ignition system must be of the greatest possible efficiency. For the present it is the mixture phase of the subject that will be treated. Since the mixture is not equally homogeneous in all parts of the combustion chamber, leastwise in motors in general, it is a fair inference that the spark plug should be located in the zone that will afford the greatest uniformity, for then the results will be the most satisfactory. Fig. 39 shows a design of cylinder in which the inlet valve is placed outside of the exhaust valve on the same side of the cylinder, and as will be readily understood, the mixture comes in and passes over the heated exhaust valve so that while the exhaust valve is thereby cooled it is also true that the mixture is heated up at that point and it becomes very inflammable as a result.

In cylinders of this design it was found that the spark plugs worked very much better over the inlet valve than they would when placed over the exhaust valves. This was found to be true after repeated trials with the spark plug in the respective places at different trials and the only way to account for the difference is to assume that a more uniform mixture is to be had over the inlet valve with the possibility that the close proximity of the heated exhaust valve has an influence for good. All of these questions of the location of the spark plug take into account the question of scavenging, for were the cylinders completely emptied of the exhaust products, it is highly improbable that the location of the spark plug would be a matter of such great moment.

There is one other phase of this question, although it is but a variation of what has already been stated. If the carbureter is an imperfect device and if liquid gasoline enters the cylinders of motors the spark plug should not be located in a highly heated zone, for then the coking process will take place in contact with the nodes of the spark plug with the result that the plugs will soot up. When the spark plug is in a pocket to one side of the combustion chamber it is probable that the coking process is sufficiently isolated from the spark plug to enable the same to perform its functions without sooting up.

Since water is one of the products of combustion and in view of the short-circuiting effect of a drop of water on the nodes of the spark plug, it is also desirable to locate the same out of the zone of direct and intense combustion rather with the hope that water will not form on the nodes. This question of water interfering with ignition will stand some more investigation.

(To be continued.)

Some Further Ignition Hints

By Morris A. Hall

A QUESTION often asked relative to the popular use of storage batteries for ignition purposes is, is this popularity deserved or not? In their favor it must be said that they do the work and do it well; even enemies will admit that. But it is a fact that the general automobiling public do not understand the action of a storage battery, and as a result those who shun its use are numerous. So, it will be an excellent idea to look into its action and see wherein it is simple and where, if at all, it is complicated.

First of all, it will be necessary to say that in what follows much is described which pertains to storage batteries for the propulsion of cars and other heavy work, rather than for the lighter simpler work of gasoline ignition. The excuse is offered, however, that in principle and in action all storage cells or accumulators are alike, so that a description of one is a description of all of them.

Staggered Positive Battery Plate.

Primarily, the action of generating a current in a storage cell is a chemical one, so any explanation of the internal action must go into the chemistry somewhat. Ordinarily, the lead battery is used, in which lead in two different forms is used for the two electrodes. These electrodes are placed in dilute sulphuric acid which attacks the lead, with the result that a lead sulphate is formed and the acid reduced to water or atoms of free hydrogen.

The water used should be pure distilled water and should not be poured into the acid. The proper method of procedure is to pour the acid into the water. The influence of a small addition of acid to water is very small, practically negligible, while adding water to a body of concentrated acid, sets up a chemical action which is liable to be a violent one, the heat liberated by the action in this case being very great.

The Fundamental Battery Equations—This fundamental action is best expressed in the form of an equation, or more correctly, several equations, which represent correctly the action taking place in the battery. Thus we have:

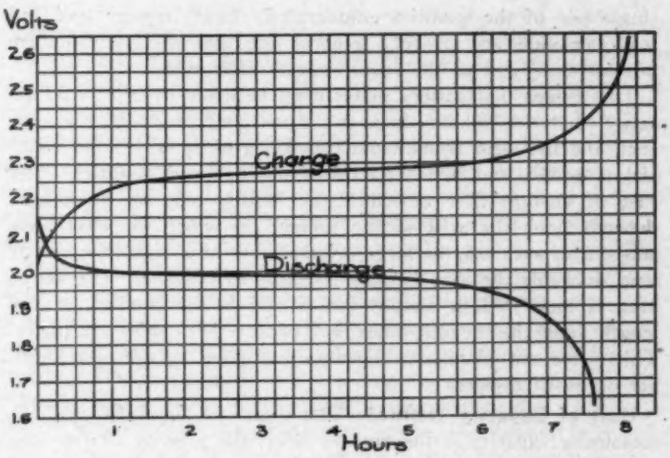
$$\text{(a)}\quad Pb\,O_2 + H_2\,SO_4 \underset{\text{Charge}}{\overset{\text{Discharge}}{\rightleftharpoons}} Pb\,SO_4 + H_2O + O$$

$$\text{(b)}\quad Pb + H_2\,SO_4 = Pb\,SO_4 + H_2$$

$$\text{(c)} = \text{(a)} + \text{(b)} \text{ or}$$

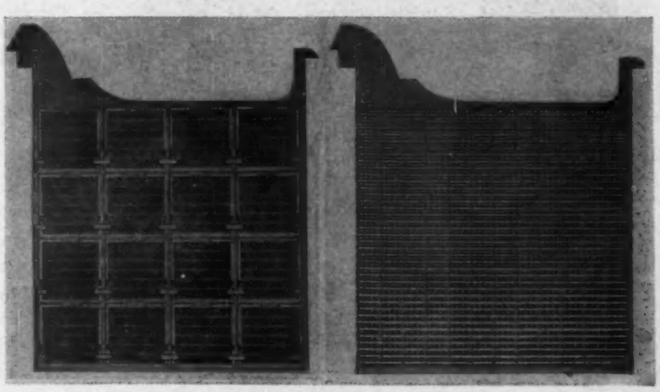
$$Pb\,O_2 + Pb + 2H_2\,SO_4 \underset{\text{Charge}}{\overset{\text{Discharge}}{\rightleftharpoons}} 2Pb\,SO_4 + 2H_2\,O$$

in which (a) is the reaction at the positive plate, (b) the action at the negative plate and (c) the combined effort or the fundamental equation of the lead storage battery. This equation shows that on charge, both electrodes start as lead sulphate, $Pb\,SO_4$, and combining with the dissociated gases of the water in the electrolyte, at the negative plate, turn into lead, and at the positive plate into lead peroxide, respectively. Also, the SO_4 is released which combines with the water in the electrolyte to form sulphuric acid, $H_2\,SO_4$. Reading from left to right for the discharge, as indicated by the lower arrow, it is seen that the action is the change of lead and lead peroxide, respectively, on the negative and positive plates, into lead sulphate, and the reduction of sulphuric acid into water.

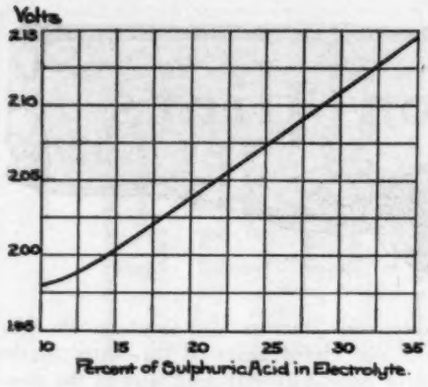


Typical Diagram of Charge and Discharge.

This, of course, represents only the initial and final reactions, as scientific men have never been able to prove or even agree upon the various intermediate reactions. Among the products said to be formed, each having somewhat of a following, are: Persulphuric acid, $H_2\,S_2\,O_8$; perplumbic acid, $H_2\,Pb_2\,O_7$; hydrated lead peroxide, $H_2\,Pb_2\,O_5$, and many others. Without going into this matter, which at best is beyond the scope of this paper, it will be sufficient to say that this action, although chemical, produces an electric current and it flows, when the two terminals of the positive and negative plates are connected by means of a substance, which is a conductor of electricity. These are usually copper wires, but the terminals of the battery itself are usually wide strips of lead.



A Comparison of Ordinary Positive and Negative Grids.



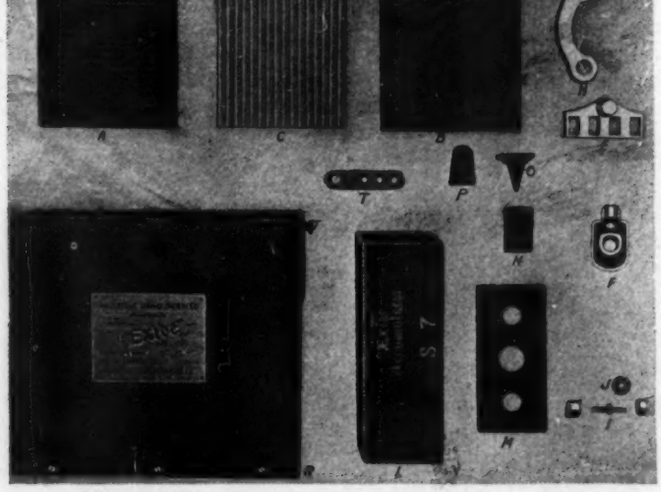
Adding Acid Increases Density.

There are three necessities in battery plates, which cause the varied use of substances differing so widely as those found on commercial examples. These three are: Strength, rigidity and high conductivity. Strangely enough, no one of the active materials now in use possesses a single one of the qualities enumerated. Lead, spongy lead and lead peroxide are in very general use and no one of them possesses any one of the requirements mentioned.

This means that battery plates must be made in two parts, the active material, which does the work and produces the current, and the rigid framework, called a grid, to which the material is added, and which possesses the required qualities. The rate of current flow at which the battery may be discharged depends upon the area of the surface on which the electrolyte acts. This area may be large or small, but as a high-flow rate is very desirable the area is made as large as possible. The active area is measured in square inches and is the product of the length times the breadth times two, because both sides are active. This is for one plate, and must be multiplied by the total number of positive plates.

Unit of Capacity Defined—The usual or standard unit for measuring capacity is the ampere hour, the product of the rate of discharge (previously spoken of as the rate of current flow) by the time which the battery takes to discharge at the standard rate 1.8 volts. Units of capacity vary with the rate of discharge, the unit being less at a rapid rate than at a slow rate, although the contrary might be thought to be more reasonable. The eight-hour rate is normal, that is to say, this is the usual time in which the battery will discharge its rated current without falling below the set figure of 1.8 volts. As an example, a battery rated at 80 ampere-hours will discharge 10 amperes continuously for eight hours without falling below 1.8 volts.

Electromotive Force, abbreviated E M F, is defined as the electric pressure or difference in potential between two points, in this case, the positive and negative electrodes, causing current to flow. Now the sulphion SO_3 is abstracted from the electrolyte on discharge as the fundamental equation shows. If this were carried to extremes, and all of the SO_3 taken, then only water would be left, and the E M F would be but 1.46 volts. But SO_3 is actually only taken from the acid where it is in contact with the plates. As it is removed the density is decreased, which causes circulation, thus allowing fresh acid to take the place of the exhausted. The chemical action is quickest in the minute pores of the plates, where the circulation is most difficult. When the cell is allowed to stand these minute areas are flooded with fresh electrolyte and the voltage will rise a very marked amount. The foregoing is the explanation of the recuperative power of a storage cell, which allows the voltage to rise after discharge has taken place, if the battery be allowed to stand on open circuit for a few minutes.

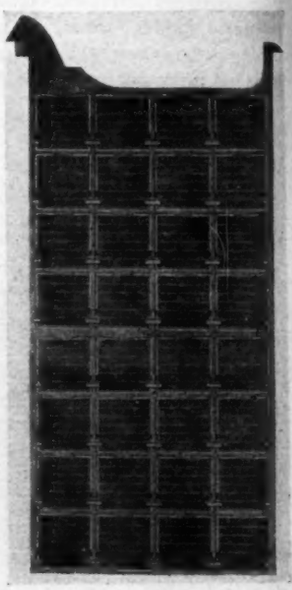


Complete Set of Parts of Sparking Battery Dissembled.

Success Requires Many Things—The principal requirements of a satisfactory storage battery are many and total at least seven. These are:

(1) The arrangement of the grid and actual material must be such that the current flows equally through all parts of the plate. This requires that the resistance be the same from any two points to the lug, which is obviously impossible theoretically, but in practice is approximated.

(2) The construction of the grid must be such as to allow of expansion and subsequent contraction under the heat of charging and discharging. As the source of most of storage battery trouble this has been given much thought without remedying the trouble. One could almost say that this requirement is impossible of attainment. The expansion on formation, or charging as it is called, is very great.



Sometimes the Grids are Made Long.

(3) Fastening of the active material to the grid is most important as is also the electrical contact at the lines of fastening. Usually both are good at first, but on subsequent expansion the electrical contact is lost first, resulting in the ultimate loss of any actual contact. When that happens the battery is useless.

(4) Construction of the grid should be such as to resist the corrosive action of the acid. While practically impossible, the material is so selected and proportioned as to last as long as the active material, so that in replacing the latter it is easy to also replace the former.

(5) Local action must be prevented, which is done by making the grid of such a material that no action is set up between the plate and the active material. In many cases sheet lead is used and serves well the purpose.

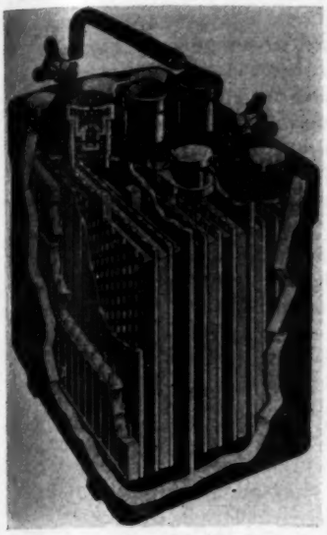
(6) Provision must be made for the circulation of the electrolyte, this being fully as important as any of the foregoing.

(7) Last but not least, the active material must be so disposed as to present the greatest possible surface to the acid.

As of interest and pertinent to the subject, a number of different grids are shown. The usual shape is nearly square, but in some exceptional cases it is desirable or necessary to have a long or narrow shape. With this, the depth of the acid assumes a more important place than in the case of the ordinary plate. As of equal concern to the novice, all of the parts of a storage cell, built primarily for sparking purposes, are shown, even to the hard rubber jar, and the wooden box which encloses the whole. Another illustration shows a different sparking battery assembled but with a corner cut out to display the manner in which the parts are correlated when ready for use.

To contrast with these, a full set of cells for car propulsion is shown, connected up ready to be put in place. These show little of the internal construction, but give a good idea of the size and space necessary for a vehicle's motive power.

Charging and Discharging Display Peculiarities—In the first diagram is shown the phenomenon of charging and discharging, represented graphically. From this it will be seen that the two operations are by no means the reverse of one another. On charge, beginning with two volts, the current rises rapidly in the first hour to 2.25 volts, from which the increase is more gradual during the ensuing time up to about the seventh hour. At this time the cell is nearly charged, and the voltage rises with great rapidity to 2.65, during which latter rise much care must be exercised else the battery will be overcharged with consequent damage.

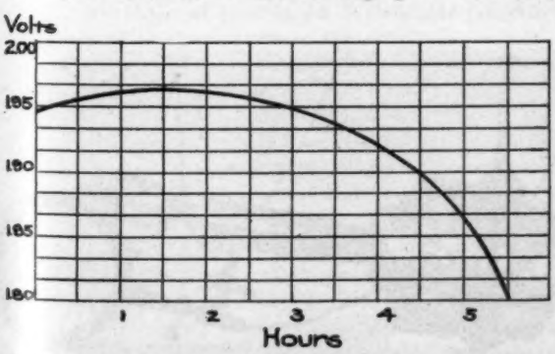


Battery Cut Open to Show Construction.

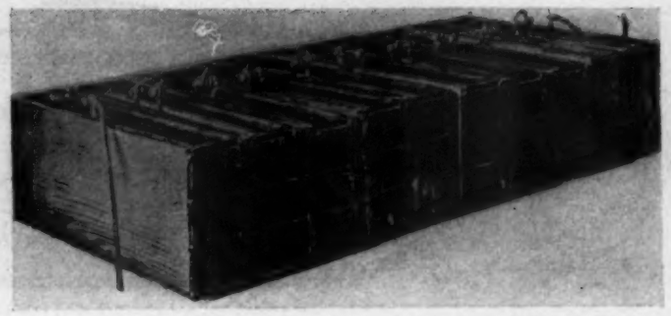
Upon discharge, an entirely different set of results are met. Commencing at a high voltage of 2.15 the drop within the first fifteen minutes is very noticeable. After this it is more gradual up to the end of the first hour, beyond which it assumes a very slow, gradual drop to the end of 5½ hours. At that time the drop becomes more pronounced, and beyond the seventh hour must again be carefully watched else the cell will be drained down below a healthy point, causing damage which cannot be repaired, at least not readily or without proper facilities.

Storage cells exhibit a number of peculiarities, some of which are very interesting. For instance, if a cell is fully charged and then allowed to stand for a long period without being used, when put into use and discharged the voltage does not begin with a decided drop as in the ordinary case, but on the contrary rises for nearly an hour and a half. Beyond this point, however, the drop is more sharp than in the ordinary case, at least for the middle period. At the end of the discharge the drop is much less rapid than in the case of a cell which has not been allowed to stand, fully charged, before using. This condition is shown in one of the curves, and persists through several alternations of charge and discharge, before resuming a normal condition, such that the voltage at the beginning of discharge is high, falling off rapidly during the first few minutes.

A second peculiarity is even more strange. When a cell is used and allowed to stand, it recuperates and, as spoken of above under the heading of electromotive force, the action is a sharply defined one. At any rate, a large amount of additional current may be obtained without damaging or destroying the cell. If now, the cell, in the first instance, be discharged very rapidly, allowed to stand, and used a second time, the recuperative current will be very large, so much so that the total of the first and second discharges will be far in excess of the summation of the two in the first or more ordinary case. In other words, by discharging at an initial high rate, a greater total amount of current may be obtained from the battery. This method of increasing the amount of current flow is to be deprecated, as a high flow rate usually warps the plate, causing subsequent current loss as brought out under requirement three.



Cell Which Has Stood for Some Time, Fully Charged, Has a Peculiar Discharge Curve.

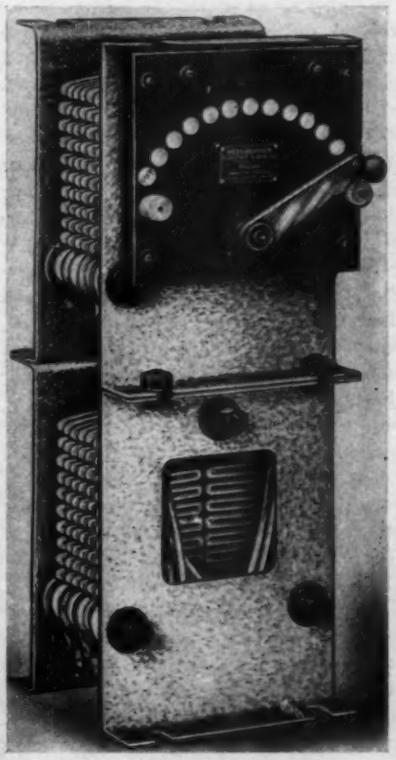


Electric Car's Power Plant Ready to Be Put in Place.

Current Varies with Electrolytic Density—It is a well-known fact among storage battery men that the voltage of any cell may be and is, influenced by the density or specific gravity of the acid solution, also, as a matter of fact, by the internal resistance and the temperature. Considering the two latter as fixed the output can be increased by an increase in the density of the electrolyte. This is done by adding a larger percentage of acid. The specific gravity of pure concentrated sulphuric acid is 1.850. As this is weakened by the addition of water, the density falls and the normal figure is about 1.250 for a fully charged cell, which decreases to about 1.150 on discharge. The curve shows how the addition of acid affects, favorably, the voltage.

There are a few general pointers which may be given to drivers who attend to their own storage batteries. The density of electrolyte, just mentioned, should be kept low, for this prevents sulphation. The temperature coefficient is negative, the resistance increasing with increased temperature, and decreasing with a drop in the thermometer. The electrolyte should be of acid made with sulphur and not from pyrites, as the latter is liable to contain injurious substances.

Mechanical Current Generators More Popular—While persons using storage batteries soon get into the habit of gauging the time of a charge, and planning forward to having it recharged at such a time as to keep the car out of commission the shortest possible length of time, the mere necessity for constant recharging has prejudiced many against it. Among these a form of mechanical generator is preferred for its ability to furnish current as long as the engine runs.



Storage Battery Charging Rheostat for Direct Current.

Compact Dynamometer Embodies Distinctive Principle*

By Prof. Wm. H. Kenerson

THE author has received from time to time many requests for a simple transmission dynamometer, and has himself often felt the need of one which would be more generally applicable than those now in use. These continued requests, together with the requirements of a definite problem whose solution demanded a rigid transmission dynamometer in the form of a coupling, led to the design and construction of the instrument described below. The accompanying illustrations show the construction of the dynamometer and its method of application and use. In Fig. 1 and Fig. 3 the corresponding parts of the dynamometer are given the same letters and are referred to in the body of the text.

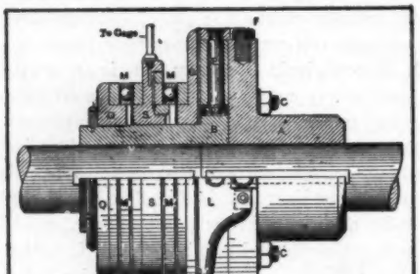


Fig. 1—Dynamometer shown in section.

The couplings *A* and *B*, each keyed to its respective shaft, are held together loosely by the stud bolts *C*. The holes in the flange *A* are larger than the studs *C*, so that these studs have no part in transmitting power from one shaft to the other. The power is transmitted from *A* to *B* through the agency of the latches *L*, four of which are arranged around the circumference of the flange *B*. These latches are mounted and are free to turn on the studs *E*. The two fingers of the latches engage the studs *F* on the flange *A*. On the ends of each latch are knife-edges parallel to the stud about which the latch turns. For either direction of rotation of the flange *A* the latches *L*, which are in effect double bell-crank levers, will exert a pressure on the disc *G*, tending to force it axially along the hub of the coupling *B*, and this pressure, it will be seen, is proportional to the torque.

Between the end-thrust ball, or roller, bearings *M M*, is held the stationary ring *S*, which is the weighing member. *O* is a thrust-collar screwed on the hub of *B*, and *P* is its check nut, which is ordinarily pinned to the hub when in position. The stationary member *S*, in the form of a ring surrounding the shaft, is prevented from rotating by fastening to some fixed object the attached arm. In this ring is an annular cavity covered by a thin diaphragm of sheet copper, *D*, against which the ball-race of a thrust-bearing presses. The edge of this ball-race is slightly chamfered to allow some motion to the diaphragm. The cavity is filled with a fluid, such as oil, and connected by means of a tube to a gage. The oil pressure measured by the gage is proportional to the pressure between the thrust-bearings, which in turn is proportional to the torque.

The instrument may be calibrated in the torsion-testing machine or by means of a sensitive friction brake. Fig. 4 is an actual calibration curve for a small instrument, obtained by hanging standard weights at proper distances from the shaft on a horizontal lever attached to the shaft, and reading the pressures indicated by the gage for the various torques shown in the diagram. For ordinary purposes, however, it is not necessary to calibrate the instrument by actual trial, since computations of the oil pressures for the various torques from the lengths of the lever-arms and diaphragm area check very closely.

It will be seen that the weighing means is similar to that employed in the Emery testing-machine, which is recognized as being extremely accurate. It will be possible to employ the Emery flexible steel knife-edges on the levers if desired, but this has been found in practice an unnecessary refinement.

The construction makes the coupling as nearly rigid as materials will permit, the movement of the diaphragm being extremely small. The only flow of oil through the copper connecting-pipe is that sufficient to alter the shape of the Bourbon tube, if that be the form of gage employed. As soon as the normal position of the gage is reached this flow ceases, hence there can be no fluid friction. It is possible, therefore, to use as long and as small a tube as desired without introducing error. Where the gage is placed at a distance above or below the level of the coupling correction should, of course, be made for the difference in static head.

Other means than the gage shown may be employed to measure the fluid pressure. Where extreme accuracy is desired it will be well to employ the weighing-device used with the Emery testing machine. The manograph has been used in this connection to measure variations in torque too rapid for indication by the ordinary gage. For example, the variations in torque in a single revolution of the shaft of a three-cylinder gasoline engine have been recorded with its aid.

Where the rate of rotation of the shaft is variable and it is desired to indicate the horsepower direct, the combination of gage and tachometer shown in Fig. 5 is employed. The hydraulic gage is connected to the coupling described, its pointer therefore indicating torque. The pointer of the tachometer shows the number of revolutions per minute. Being a function of the revolutions per minute and the torque, the horsepower will be indicated by the intersection of the two pointers and suitable curves on the dial as shown. Arrangements for recording or integrating the work done may also be attached to the coupling in any ordinary manner, or a gage may be used.

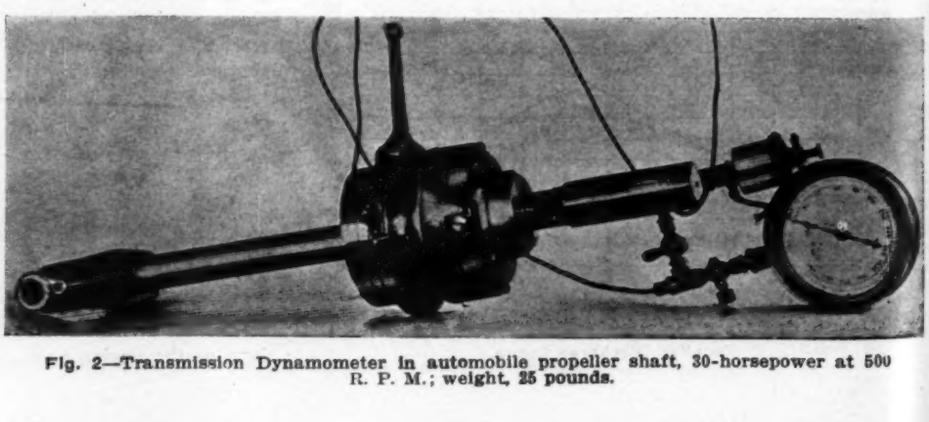


Fig. 2—Transmission Dynamometer in automobile propeller shaft, 30-horsepower at 500 R. P. M.; weight, 25 pounds.

*Presented at the Washington Meeting (May, 1909) of the American Society of Mechanical Engineers.

A summary of some of the more important characteristics of the instrument follows:

a The instrument is compact. The example shown in Fig. 2 and Fig. 3, which is designed to transmit 30 horsepower at 500 r.p.m., is about 5 3-8 inch in diameter and weighs about 25 pounds.

b It is as rigid as an ordinary flange coupling.

c It may be made in the form of a coupling, and will then occupy about the same space as the usual flange coupling, or it may be made in the form of a quill on which a pulley is mounted, or any other suitable form. This form may be made in halves for application to a continuous shaft.

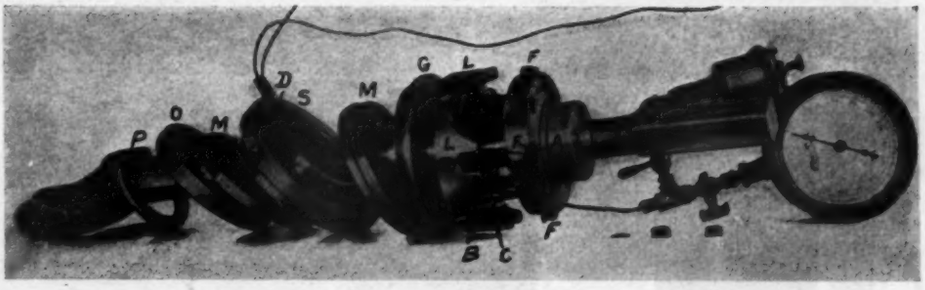


Fig. 3—Transmission dynamometer taken apart to show construction of constituent parts.

d It will indicate for either direction of rotation of the shaft.

e The torque may be read and recorded or the work integrated at a considerable distance from the coupling.

f The readings do not require correction for different speeds of rotation. All parts containing oil are stationary, hence are unaffected by variation in speed. Other parts are likewise unaffected by the action of centrifugal force.

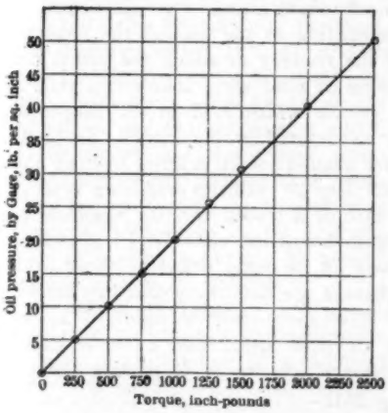


Fig. 4—Calibration curve for transmission dynamometer.

g It may be made very sensitive and accurate. The construction lends itself very easily to variation of range of application and to varying degrees of sensitiveness, since the oil pressure, and hence the sensitiveness of the instrument, depend upon the area of the diaphragm, the relative lengths of the arms of the latches *L*, and the diameter of flanges. Its accuracy is dependent mainly on the degree of accuracy of the means employed to measure the fluid pressure, of which a number of forms, other than the usual pressure-gauge, are available. The latter, however, is the more usual.

h The only power absorbed is the small amount due to the friction of the ball, or roller, bearings, and this can be determined from the pull of the retaining arm. It is unnecessary to make correction for this, however, since the amount is so small as to be negligible.

i Since the only wearing parts are the ball, or roller, bearings, which may be lightly loaded, the instrument should not be deranged easily. Because of the very small volume of oil contained in the weighing chamber, ordinary temperature changes do not affect the calibration. All parts containing oil are stationary, hence all joints may be soldered and leakage entirely prevented, which is a feature of this device.

j With suitable material and ordinary workmanship, it is believed that there is little likelihood of failure of any part of the instrument. It is conceivable, however, that the balls or rollers, although lightly loaded, might crush; the diaphragm might shear; or the stationary member, although bearing only its own weight and lubricated, might seize to the hub. Remote as are any of these possibilities, should any or all of them occur, the worst that could happen would be the tearing-off of the oil pipe and retaining arm, when the whole would revolve as a solid coupling. In no case can the coupling fail to drive the shaft because of its variation from the standard form, since, in addition to the driving latches employed to carry the load normally, the same number of connecting bolts may be employed as in the ordinary coupling, which will still hold the coupling together should the latches fail. Since, however, these latches are farther from the shaft, they should, if properly constructed, be less likely to fail than the connecting bolts usually employed.

It is believed that uses for the instrument here described will suggest themselves, and it is with the hope that the device will prove of some interest to those who deal with the use and transmission of power that the matter is presented.

A NEW SOLDER FOR ALUMINUM.

The problem of soldering aluminum has troubled experts in the soldering line for many years, and most of the liquids brought out for the purpose have developed some unsurmountable drawback when put into use. As a result of this the idea became prevalent that no liquid would do the work.

However, the lack of an effective flux caused the formation of oxide, which always prevented a proper joint being made. Prompted by the conviction that without an intermediate it was impossible to make a good soldered joint, Otto Nicolai, Boppard-on-Rhine, Germany, managed to make a good flux after many years of experimental work.

But the great problem was not really solved without having a solder with the same fusing point as the flux. The inventor's next step was therefore to find a suitable solder. He ultimately succeeded in getting over this difficulty as well, so that an effective solder can now be had. An important feature is that one need only scrape the aluminum to make it clean before soldering and then to wipe the joints with the Nicolai flux.

Solder mixed with the flux is now put on to the joint and will run into the crevices by itself; it will cover surfaces of several square centimeters in area, and the joint obtained in the end is inseparable. Sheets with a joint can be hammered quite thin without injuring the joint. This solder and flux are being used at the imperial dockyard in Kiel and at the royal gunpowder factory in Spandau. At the imperial dockyard in Wilhelmshafen the inventor soldered a new bottom on to a tea kettle of the kind used by bluejackets. The length of the seam was 75 cm. A flask which had become leaky was also soldered.

This and much other work of a soldering nature was passed upon by the Government engineers and pronounced perfect, at least as far as the quality of the weld was concerned. So, Mr. Nicolai has the stamp of approval of the German Government upon his process, which, alone, speaks highly of it. This solution of the aluminum problem is a welcome one.

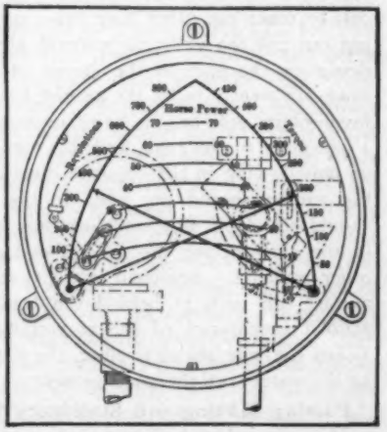


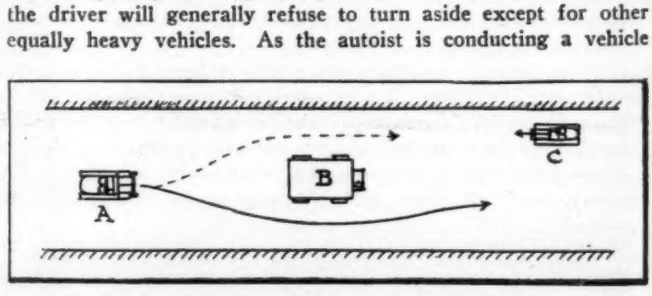
Fig. 5—Combination pressure gauge tachometer, indicating torque, revolutions per minute and horsepower.

ALTHOUGH autoists pay attention to the mechanical details of driving, such as the adjustment of spark and throttle, gear changing and brake operation, the extremely important function of oiling is not given the care that it deserves. Since the car has been tested and adjustments have been made before leaving the factory, it is presumed that everything will continue to operate properly when on the road. To the credit of the manufacturers this is true in a large majority of cases, but even the best oiling devices suffer by neglect, sight feeds clog up or the driving belt may break, with unhappy results. The autoist should take no chances, but constantly observe the sight or circulation feeds and as soon as a cessation of flow is noted it should be investigated and the trouble repaired at once. The oiling directions given in the instruction book should be followed to the letter, and if the conditions of the run are abnormal oiling should be performed oftener than usual. In every instance an excess of lubricant is more economical than worn or broken bearings.

Caution Needed in Overtaking Vehicles—There are two general principles to be remembered in overtaking or passing vehicles on the road. These are: Be sure that there is a clear way ahead before the overtaking or passing is attempted, and never to cut things so fine that a swerve on the part of the other man will cause a mishap. Quite a large proportion of road collisions come from either of the parties concerned taking chances that the other will do the right thing, which seldom happens. In overtaking another vehicle, care should be taken to ascertain that the driver is aware of your presence, particularly if he is driving a covered vehicle or one that is noisy. It is often difficult to make the other man hear, and the chances of his swinging out are too great to warrant any risk being taken. A tendency on the part of the driver to turn off to the side of the road, apparently to let the autoist go by, may be the result of an involuntary pull on the reins or may have been done to avoid a bad place in the road, and this turning off is often followed by an equal swing in the opposite direction. In following a vehicle the autoist should not keep in the other vehicle's tracks, but should stand off diagonally so that he or one of the passengers in the car can see the road ahead and observe the actions of other vehicles. Sufficient distance should be kept so that the autoist can turn in behind the leading vehicle in case of the sudden appearance of others coming in the opposite direction. When the way ahead is clear, the autoist should pass as quickly as the nature of the road permits.

Passing Moving and Stationary Vehicles—The chief point to be remembered in passing moving vehicles is to always allow plenty of room for both. The passing of another vehicle so closely that there is hardly room for a sheet of paper between them, may be looked upon as brilliant driving, but sooner or later some one will miscalculate and an accident will occur. All passing should be done according to the rule of the road prevailing in the section of the country in which the car is being driven, as the great majority of road users follow this rule, and in case of accident the vehicle which held to the proper side of the road is generally exonerated in the courts. In passing stationary vehicles or those about to start, a strict lookout ahead should be kept for pedestrians or vehicles suddenly emerging from the rear, or in the case of a trolley car, for alighting passengers and those rushing to board the car. It is not sufficient to blow the horn and count on its being heard by those behind the other vehicle. The chances are that the sound has not been heard, and nothing but slow speed can be indulged in with safety. The same need of slow speed and extreme caution occurs in overtaking stationary vehicles as in passing them.

Passing on the Wrong Side—As a rule, all vehicles should be passed on the proper side according to the rules of the road, but there are occasions when it is unsafe to pass in this manner and the autoist has either to pass on the wrong side or wait until conditions are such as will allow him to pass according to rule. Such an occasion often presents itself in overtaking a heavily loaded vehicle or one which has been disabled and has not been withdrawn to the side of the road. Once a loaded van or truck leaves the crown of the road, it has some difficulty in getting back again, especially if drawn by horses, and the driver will generally refuse to turn aside except for other equally heavy vehicles. As the autoist is conducting a vehicle



Case When Car May Pass On Wrong Side.

of greatly superior speed and mobility than that of the truck, the latter can be considered as a stationary object for the time being and passed on the wrong side, provided the road is clear. The situation is shown in the sketch where *B* is a truck and *A* a car about to pass the truck. The road being clear, car *A* can take the course *a*, passing the truck on the wrong side. Should the course *b* be taken, a collision is likely to occur between the car and another car *C* proceeding in the opposite direction, unless great caution is exercised by both drivers. If

there is any doubt as to the road not being clear, the autoist should take no chances but wait until the way on the left of the truck is clear and then pass on the proper side. Situations like the above occur from time to time on the road and the autoist should use his judgment in coping with them. Legally it is not justifiable to depart from the rules of the road except to avoid accidents, and this should be borne in mind at all times.

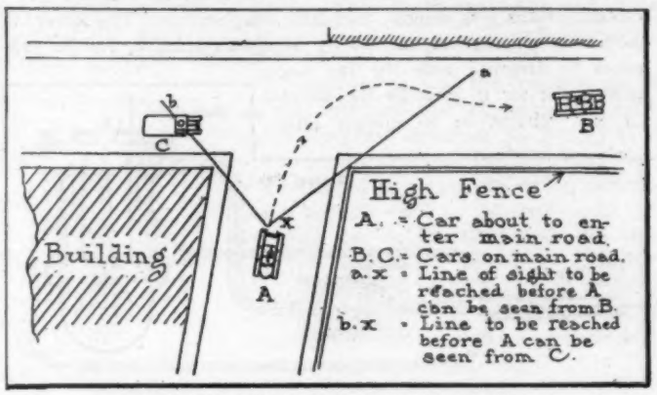
Passing Horses on the Road—The majority of horses encountered on roads frequented by automomiles to any extent, pay comparatively little attention to them, even when passed at fairly high speed, and of the remainder it is safe to say that most are not nearly so alarmed as their drivers, who communicate the alarm to the horses through sawing on the bit, shouting or dropping the reins. The exceptions are young horses or those which have not been given sufficient road driving. In passing horses, the autoist should not only observe the actions of the horse, but also those of the driver as well. If the horse exhibits signs of being restive, the voice has a very quieting effect. Expressions such as "Whoa, boy," said in a reassuring tone will in many cases be sufficient to soothe the animal until the car can pass.

The best manner in which to pass a standing horse headed in the same direction as the car is to cross to the far side of the road and drive by quietly at the legal speed. The horse will be only slightly startled, if at all, and will not bolt or back, as the alarming object and its terrors are gone. More care is necessary in passing a horse headed in the opposite direction, as the animal can see the car coming and has time to become fidgety. If the driver has the animal under control, the car can be driven past at the regular pace unless signs of fright are seen, when the car should be slowed down or stopped if necessary. The car should pass on the opposite side of the road and as soon as it is by speed can be increased in order to get out of hearing as soon as possible.

Procedure in Leading a Horse—It may be necessary in some cases to stop both car and motor and to lead the horse past the car. As a number of accidents have occurred through the horse freeing his head from the bridle through improper leading, a word on proper leading a horse will be timely. Both reins should be taken in the right hand about 6 inches from the bit and the horse patted and reassured by the voice. The autoist should then face forward and start off, walking alongside the horse's head until past the car. Should the animal rear, the grip on both reins prevents him from tearing free from the bridle and bolting. The usual mistakes made in leading are in grasping one rein only which hurts the horse's mouth and may break the bridle, and in dragging the horse along while walking backward. As a horse will not willingly walk over a man and as this is the position usually assumed by drivers when hitting the animal over the head, instead of having a soothing effect the operation is rendered harder through alarming and confusing him.

Proper Negotiation of Road Crossings—In approaching road crossings the autoist should slow down to a speed at which he can pull up on the brake within the length of his car, and blow his horn for the purpose of warning other road users of his presence. As the car approaches the crossing, a sharp lookout should be kept for traffic on the intersecting road, and as soon as the way is seen to be clear the crossing should be taken as quickly as possible. Particular care should be exercised at crossings where one road is partially or totally hidden from the other until the crossing is reached, especially in the smaller towns, as light carts, bicycles or in fact vehicles of any kind frequently emerge from the side road at speed and in the most careless manner, even when those in control are unable to see anything that is approaching on the main road. In anticipation of such performances the car should be kept to the center of the road so as to be able to turn aside to avoid a collision, as even if the horn has been blown, there is no way of knowing that the driver of the other vehicle has heard it. Even if vehicles on the intersecting road can be seen, great caution must be exercised, as there is no indication that they are going to continue along the side road nor in which direction they will turn into the main road. Passing partially hidden road crossings at speed is absolutely dangerous because of the long chances which reckless autoists take at such places.

On Approaching a Blind Turn—Frequently encountered in suburban towns is the blind turn, where a cross street or road terminates in one of the main roads and the view from either road is obscured by buildings or fences until the turn is reached.


a
b
C
B
High Fence
Building
x
A
A. = Car about to enter main road.
B.C. = Cars on main road.
a.x = Line of sight to be reached before A can be seen from B.
b.x = Line to be reached before A can be seen from C.

Illustrating Blind Turn and Its Negotiation.

At such turns the chances of accident are greater than at road crossings, as at these latter places an autoist has three directions in which he can turn to escape collision while at blind turns there are but two, with the chances in favor of the car on the side road. Referring to the sketch, *A* is a car about to enter the main road and proceed thereon in the right-hand direction, and *B C* are cars proceeding along the main road. Owing to the high fence on one side and the building on the other, *A* cannot be seen from *B* or *C* until the lines *ax* and *bx* are reached, nor can *B* or *C* be seen from *A*. The sound of a horn from either road likewise cannot be heard from the other. Under the circumstances, car *B* should keep to the center of the road as in negotiating road crossings and car *C* should keep to the right-hand side of the road and proceed cautiously. When the car *A* makes the turn into the main road, it should take the path shown by the dotted line, swinging well out to avoid a possible collision. Car *B* has thus an opportunity to turn aside and avoid *A*. Should *A* turn to the left into the main road, car *C* is in no danger even if the driver of the former car cuts the corner closely. The positions shown in the sketch should be assumed at all times when approaching a blind turn whether the presence of a car on the other road is known or not.

The Right of Way at Turns and Crossings—Regarding the right of way at turns and crossings, the vehicle which arrives first has the priority of passage according to actual road practice. In case of a "dead heat" between two cars, it remains for both drivers to agree as to which shall proceed ahead of the other, the driver yielding the way giving a signal with the hand. Generally speaking, horse traffic gives the precedence to automobile traffic as a matter of safety, but the autoist should not consider that he has the absolute right of way over all other road users for this reason. Every user has equal rights on the road, but because the autoist has a vehicle of great physical superiority due to its weight and speed, he is not entitled to lord it over those not so well equipped. It does no harm to yield the road to a horsed vehicle even if the action necessitates a change of gears or a stoppage of the motor. On the contrary, the courtesy shown will do much toward removing the prejudice against automobiles in that portion of the country. In general, the autoist should exercise his discretion as to what is proper under the circumstances, departing from road practice if necessary, and his individual sense of fair play should cause him to have regard for the rights of others at all times.

(*To be continued.*)

AN INTERESTING NEW AIR COOLING SYSTEM

ADDITIONAL light is being shed upon the subject of air—or, as it is sometimes called, direct cooling, by a number of experimenters working along new and radically different lines. The idea of an Englishman, E. H. Morgan, is to circulate air through the regular water jackets, so that it circulates around the heated cylinders. The use of air as a medium in the water jackets means less weight, and less complication. The latter, in particular will be emphasized by Morgan's scheme, for he proposes to dispense with the fan and induce the air to flow by the action of the exhaust in an ejector pipe.

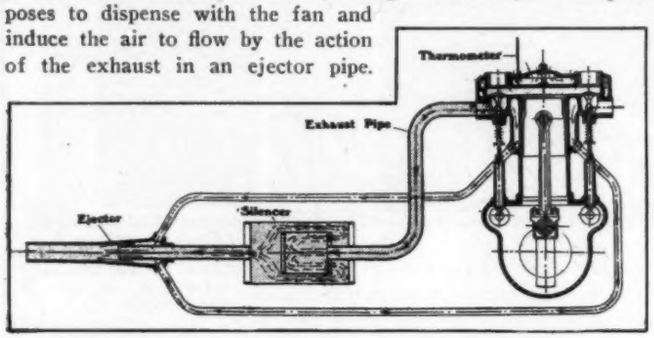


Diagram of Morgan's Air-Cooling System Showing Action.

In this way, as the cut shows, the pump and its drive is not only dispensed with, but the fan and fan drive, is also done away with. The muffler used (the English call it a silencer) is a very simple one, being merely a cylindrical shell about nine inches long by seven inches in diameter. Within this is placed another drum of smaller dimensions, to which the end of the exhaust pipe is fastened. The gases are allowed to flow into the one end and strike the other, when they turn and escape by the front end, which is perforated. Once more, the shape turns them through 180 degrees, and thence they escape into the induction pipe or ejector as it is marked on the cut.

This is of large diameter and the gases pass rapidly through it at a high speed, this varying with the work which the motor is doing and not with the speed alone. The latter is said to be the chief objection to the ordinary method of blowing air against the exterior of the cylinders by means of a fan or blower operated from the engine itself. This means that the speed of the fan, and consequently the speed and volume of the air, vary with the rotary speed of the engine. Now, at the time when the greatest amount of air is necessary, as at slow speeds on a hill the least amount is being furnished.

This has been carried beyond the theoretical point by means of thorough tests. The latter were made on a Milnes-Daimler four-cylinder engine 96 mm. bore by 130 mm. stroke (3¾ by 5⅛), the rating for which would be 22½ horsepower.

In the actual test, the motor developed much power in excess of this. The temperature of the air within the water jackets just previous to the commencement of the run was 70 Fahr. Three minutes after applying the load to the prony brake (ten minutes after starting the engine), it had risen to 190 degrees. Five minutes later 240 degrees was reached, and a further running of fifteen minutes caused it to go to 275 degrees.

Mr. Morgan ran the engine with very little oil purposely, and many thought that he was courting disaster to use so little, in view of the high temperatures. Examination of the exhaust showed not the slightest trace of oil, and no effects of the lack of it were observable. The engine ran with perfect regularity during the test, maintaining a speed of 840 revolutions, at which the power developed was 38. After 35 minutes' continuous running the prony brake band seized, due to lack of water, and the motor was stopped. At this, the temperature within the jackets rose to 440 deg., and some difficulty was experienced in restarting.

The engine was started again, and run at the same speed but with a lower load, so that the power was but 31.5. This run continued for over 20 minutes, when trouble with the brake band, due to lack of water, caused the second stop, and with it the observed temperature in the jackets again rose. This apparently had no other effect than to burn the film of lubricating oil from the cylinder walls. There was no evidence of preignition at any time during the tests, and the average of careful observations of the temperature of normal running showed it to be in the neighborhood of 275-280 deg. Fahr.

This was by far the most unsatisfactory of all the tests made, but the figures for the others are not available. It may be seen that the normal figures deduced from a not wholly satisfactory test are just midway between the maximum figure for water-cooled motors and the recommended temperature for air-cooled engines, namely, 205 deg. for water and 350 deg. when air is used. These two average 278 deg.

THE AUTOMOBILE CALENDAR.

Shows, Meetings, Etc.

Nov. 6-13.....Atlanta, Ga., Auditorium-Armory, National Automobile Show.

Jan. 8-15.....New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Feb. 5-12.....Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Races, Hill Climbs, Etc.

May 28-30.....Denver, Col., Reliability Contest, Pueblo and return, Denver Motor Club.

May 29.....Wilmington, Del., 106-Mile Sealed-Time Run, Delaware Automobile Association.

May 31.....Wilkes-Barre, Pa., Annual Hill Climb, Giants' Despair Mountain, Wilkes-Barre Automobile Club.

May 31.....Bridgeport, Conn., Annual Hill Climb, Sport Hill, Automobile Club of Bridgeport.

June 1.....New York City, Start of Transcontinental Contest to Seattle, for Alaska-Yukon-Pacific Exposition, M. Robt. Guggenheim Trophy.

June 5.....Albany, N. Y., Hill Climb, Kenwood Hill, Albany Automobile Club.

June 9.....National Orphans' Day.

June 12.....Worcester, Mass., Annual Dead Horse Hill Climb, Worcester Automobile Club.

June 12-14.....New York City, Catskill-Berkshire Endurance Contest, New York Automobile Trade Association.

June 14-18.....Philadelphia Reliability Run to Pittsburg and Return, Quaker City Motor Club.

June 14-21.....Annual 660-Mile Spring Tour Maxwell-Briscoe Motor Club, New York City via Waterbury, Stockbridge, Newburgh, Delaware Water Gap, Philadelphia, Atlantic City, to New York.

June 17.....Readville, Mass., Track Race Meet, Bay State Automobile Association.

June 18-19.....Chicago, Stock Chassis Race for Cobe Trophy and Light Car Race.

June 21-26.....Binghamton, N. Y., Fourth Annual Endurance Run, Binghamton Automobile Club.

June 22-28.....Albany, N. Y., Fifth Annual Tour, Bretton Woods, Portsmouth, Boston, Albany Automobile Club.

June 24-26.....Montreal, Blue Bonnets Track, Race Meet. R. M. Jaffray, Manager.

June 25-26.....Philadelphia, 24-Hour Track Race, Quaker City Motor Club.

July 3 and 5.....Wildwood, N. J., Straightaway Races, Motor Club of Wildwood.

Letters Interesting and Instructive

TIME FOR VALVE GRINDING.

Editor THE AUTOMOBILE:

[1,889.]—Will you please advise me how often I should grind in my valves. The motor is a four-cylinder, water-cooled, one of 30-horsepower, and recent make.
Carbondale, Pa. R. T. TRUESDALE.

There is no hard and fast rule which can be given aside from grinding when it is necessary. A careful driver may get four to five thousand miles out of his valves with one grinding, while another, with the selfsame car and engine, may only get one or two thousand miles per grinding. There are many factors which enter into the life of a valve seat, and in the frequency of grinding all of them have to be taken into account. Some of these are: imperfect cooling of the seats, as described in THE AUTOMOBILE for last week (May 13 issue); too strong springs, which cause hammering and thus wear out the seats prematurely; over-lubricating, which causes spitting and sooting, both of which reduce the active life of the valve seat.

Other causes are contributory negligence on the part of the driver in not examining them more often, which examination often results in the discovery of something in the way of soot or dust caught in between the valve and seat, and being gradually pressed into the latter.

A habit followed by professional drivers is to grind valves as soon as a certain distance has been covered, this being predetermined by experience with a single or many cars. This habit might well be followed by amateurs, as soon as they have driven enough to determine the critical mileage.

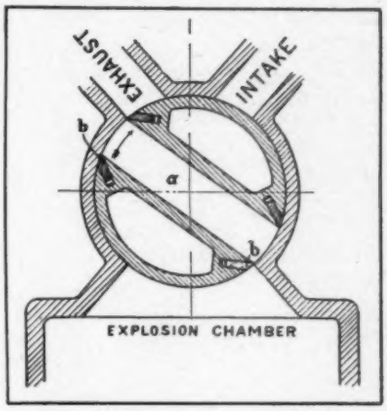
ANOTHER ROTARY VALVE

Editor THE AUTOMOBILE:

[1,890.]—I have noticed the excellent article in "The Automobile" for May 13, by W. F. Bradley, in which he speaks of a new Italian engine with a rotary valve. Has not an American motor been built with a rotary valve and if so, will you please tell me something about it and where it was built?
Philadelphia, Pa. H. F. WHITE.

In 1907 Messrs. Howard and Frayer, the latter formerly chief engineer for the Oscar Lear Company, builders of the Frayer-Miller car, built for M. W. Kouns, of Sandusky, O., an air-cooled engine with rotary valves, one rotary taking the place of two ordinary reciprocating valves. These were placed in the cylinder heads, lengthwise of the engine, and a single camshaft driven from the crankshaft by means of worm and gear drives all of them.

The valve, shown in the illustrations, rotates at one-fourth the crank speed, so that it completes a cycle in one-half a revolution. The exhaust works first in the direction of rotation, after which the passage of the incoming charge cools the valve. Circular rings on the full part and straight strips, spring-actuated, at the cut part, serve to make the valve gas-tight. An additional advantage which this device had was the ability to reverse. Upon the vertical shaft is placed a pair of gear- and a couple of



Rotary Valve Shown in Section.

dog clutches. By using one, the valves rotate in one direction and with them the engine. When the other clutch is thrown into mesh, the valves, and with them the engine, turn in the opposite direction.

The second illustration shows the air-cooled cylinders to which the valves were fitted, and one of the valves.

These engines were to be marketed by the Ohio Manufacturing Company, Upper Sandusky and Columbus, O., in sizes from 12 to 40-horsepower, but whether this firm is still in business or not is more than can be said.

Charles E. Duryea, who was formerly in business in Reading, Pa., building water-cooled engines, is a prominent advocate of the rotary valve, and his design, in which the valve is water-cooled, has many points of superiority over the one shown.

Cylinder and Valve as Actually Made.

FIXED FIRING POINT PUZZLES.

Editor THE AUTOMOBILE:

[1,891.]—Will you please explain to me the action of a magneto which allows with the disposal of the spark advance lever? These are, I believe, said to have a fixed firing point. A SUBSCRIBER.
Dayton, O.

The answer is that the intensity of the current increases and the moment of maximum intensity advances, as the speed of the armature increases. Therefore, as the engine speed increases the timing automatically adjusts itself to the conditions. The opposite also holds true, so that for starting the moment of maximum intensity is so far retarded that it is safe to crank the engine over. All of this allows of dispensing with the usual spark advance lever, with consequent simplification.

DIFFERENTIAL ELIMINATION.

Editor THE AUTOMOBILE:

[1,892.]—In reference to the article in the April 29 issue of "The Automobile" regarding the Ampere car, will you please advise me at what angle the inside road wheel is released on a curve; also, whether the current is wholly cut off at this certain point, or is there a preliminary gradual weakening of the current?
New York City REGINALD E. JORDAN.

To quote from the description of the Ampere car, on page 704, "The differential will at once be missed, and the resulting simplification noticed." And further along, "When current is turned into the magnet *E*, * * * the corresponding plate *P* * * * is attracted and as long as the current passes and energizes the magnet, is driven by the rotating axle. As soon as the current is cut off, the wheel is freed and is no longer driven from the motor."

This explains the action of the device. Now for the current, quoting once more from the same page: "The steering gear turns free up to a certain angle, at which it automatically cuts off the current to the inner wheel." The manufacturers advise that this cutting off action begins to manifest itself at an angle of 5 degrees out of a straight ahead line, beyond which the current gradually weakens continuously up to 35 degrees, at which latter angle the whole of the current is cut off and no flow of current to these magnets takes place until the wheels are turned back.

The action on straightening the wheels is just the reverse of this, when the wheels are turned back to 35 degrees out of a straight ahead line, the current begins to flow weakly, but constantly increasing in strength up to 15 degrees, at which point it has its full strength, and the wheel is fully engaged.

The makers say that these two angles have been carefully determined experimentally, as the result of several years of test-

ing work in this field of endeavor, and are therefore correct for this class of work.

This solution of the problem of the differential is an excellent one, and well worthy of imitation by our American manufacturers in their striving for simplicity.

GAS TURBINES.

Editor THE AUTOMOBILE:

[1,893.]—Will you please tell me something about the gas turbine, its prospects, a description of it, and list of books on the subject? J. W. FRANKLIN.
New York City.

The subject is too large to be gone over in this space, but it might be said that some experimental work has been done on gas turbines, more particularly on the other side. Some work has also been done in this country. None of the resulting machines have been declared successful, nor have they been put on the market for sale.

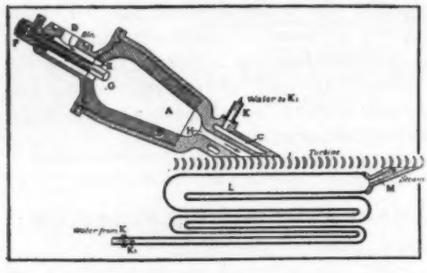


Diagram of Gas Turbine.

A prime reason for the lack of success in this direction is the impossibility of an air or, better, a gastight casing with frictionless rotation. If the former is secured, it is at the expense of the latter, and the resulting output will not be enough greater than from the reciprocating type to warrant the use of the excessive speeds of the turbine which run ten times the ordinary.

So, too, if the latter, frictionless rotation, is secured at the expense of the gas tightness, the result would not warrant a change to the newer prime mover.

In "Steam Turbines," by Stodola, a chapter is devoted to this interesting subject, as is also the case in Neilsen on Steam Turbines. A new work is entitled "Steam Turbines," by Moyer, and in it will be found several chapters on the subject. This paper, THE AUTOMOBILE, has also spoken of it at different times, although no extended article has ever been published.

We are giving, for Mr. Franklin's benefit, two reproductions of gas turbines as proposed by prominent experimenters. One of these uses steam in combination with gas, the effect of the former being to cool the blading of the rotor as heated by the exceedingly hot gases of combustion. In the view of this, the larger of the two, *A* is the combustion space. *B* the carborundum wall. *F, D, G* and *E* are the air and gasoline feeding pipes. *I* represents the rotor of the turbine. *C* is the nozzle water jacket. *L* shows the small boiler receiving hot water from the water jacket *C*, and also heated by the exhaust gases around the outside. *M* is the steam nozzle.

The other is somewhat similar, the use of carborundum for the combustion chamber walls, water for cooling, and all features of the first except the use of steam, being found as on the one first described.

PROOF OF ACID IN OIL.

Editor THE AUTOMOBILE:

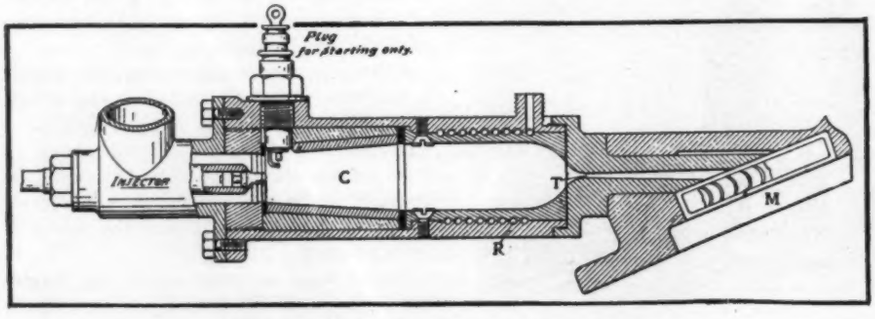
[1,894.]—Will you please give a simple method of testing lubricating oil for acid contents, one that any amateur could use. I understand the presence of even a trace of acid in the oil will, in time ruin the ball bearings and other fine parts of my car.
H. D. BLAKESLEE.
Detroit, Mich.

You are right, a trace of acid in the oil will ruin the balls and races of bearings.

Pure mineral oils contain little acid, and what they do contain is readily determined. Vegetable and animal oils, on the other hand, all have oil contents and under the action of heat these may be liberated.

A simple home test may be practiced as follows: Secure from a druggist a solution of sodium carbonate in an equal weight of water. Place this in a small glass bottle or vial. To test an oil, take a small quantity of the lubricant, and an equal amount of the sodium solution. Put both in another bottle, agitate thoroughly, and then allow it to stand. If any acid is present, it will settle to the bottom as a precipitate, the amount of the precipitation being a measure of the amount of acid present.

Another method is to allow the acid, if there is any, to attact some metal. To do this proceed as follows: Soak a piece of cloth or preferably, wicking in the oil suspected of containing acid. Select a piece of steel at random and polish it to a bright surface. Wrap the steel in the soaked rag or wicking, and place in the sunlight but protect from wind or weather. Allow it to stand several days, and if there is no sign of etching of the surface, repeat with a freshly soaked rag, being careful to use the same oil as before. After two trails if no sign of the etching appears, you may take it as free from acid.



Another Gas Turbine Without the Steam Jet.

LIGHTER THAN GASOLINE.

Editor THE AUTOMOBILE:

[1,895.]—Will you please tell me if there is any known colored liquid which is lighter than gasoline so that I could use it to make a gauge glass with? What I want is something which will float on gasoline so that I can arrange a gauge glass outside of the tank, and have the colored liquid, by floating on top of the gasoline, indicate the level of the fuel within the tank.
New Rochelle, N. Y. R. R. ROBERT.

The three necessities for the liquid to serve your purpose would be: colored, lighter than gasoline, and nox-mixable with the latter. The lightness of gasoline is measured with the hydrometer, on which (Baume) ordinarily 70 is the figure. This is equivalent to about .71 specific gravity. Now from a list of liquids of known specific gravity select one lighter than this. Here is a list of liquids and their specific gravities:

1.	Rhigoline	.615-.625
2.	Petr. Ether	.630-.640
3.	Sulph. Ether	.716
4.	Petroleum	.780-.880
5.	Kerosene 135 test	.786
6.	Kerosene 150 test	.788
7.	Pure Alcohol	.793
8.	Alcohol 95 per cent	.816
9.	Alcohol 94 per cent	.820
10.	Fuel Oil	.828
11.	Alcohol 90	.834
12.	Naphtha	.848

From this you can see that but three liquids qualify as lighter, numbers 1, 2 and 3, all of which will mix with gasoline, so that nothing that can be called to mind will answer your purpose. An additional fact which you should bear in mind is that such a proceeding as you have in mind is dangerous, and should not be tried. If the glass became broken in any way the inflammable gasoline would be free to flow out and ignite, which might mean the loss of your car.

KEROSENE AS FUEL.

Editor THE AUTOMOBILE:

[1,896.]—Will it be possible for me to use kerosene as a fuel for my double opposed 16-horsepower engine without expensive changes in construction? I am greatly interested in the fuel question and want to experiment with it, but do not want to spend a lot of money. R. H. OTIS.
Colorado Springs, Col.

Kerosene has been and can now be used in carbureters designed for gasoline, but not with any marked degree of success. It is fair to assume that you wish to determine the comparative cost of the two fuels. It is not advisable to use an ordinary carbureter, without alterations which will give kerosene a fair chance.

The main difference between the two lies in the difficulty of vaporizing the heavier fuel with the available heat. In many kerosene vaporizers this difficulty is overcome by heating the fuel before as well as during vaporization.

U.S. SEEKING THE REMEDY FOR ROADS' WEAR AND TEAR

Those Who Helped to Do the Work at the Long Island Test, Held on Hillside Avenue, May 20.

Reading from left to right: Lieut. Warren T. Hannum, Engineer Corps, U. S. A., Washington; John P. Coghlin, president, Worcester Automobile Club; Vernon N. Pierce, chief engineer, Office Public Roads; F. H. Elliott, secretary A. A. A.; Col. Spencer Cosby, Supt. Buildings and Grounds, Washington; Jos. A. Anglada (in back), New York City; David Sheridan Stanley, Major Quartermaster, U. S. A.; Major Jay Johnson Morrow, Engineer Corps, U. S. A.; L. W. Page, Director U. S. Office Public Roads; P. St. J. Wilson, State Highway Commissioner of Virginia; Alex Floyd Armstrong, New York State Department of Highways; George C. Diehl, Engineer Erie County, N. Y., and chairman A. A. A. Good Roads Board; Herman F. Cuntz, M.E., of A. L. A. M.; James Owen, C.E., representing New Jersey State Commissioner of Roads; Coker F. Clarkson, engineering department, A. L. A. M., and Thomas J. Fay, Society of Automobile Engineers, New York City.

FULLY alive to the needs of the moment, the Office of Public Roads of the United States Department of Agriculture, under the supervision of Director Logan Waller Page, is seeking to solve the natural sequence of the problem presented by the greater use of the highways through the coming of the motor-driven vehicle. Some time ago experiments on road surfaces were made in the vicinity of Washington, and again on Thursday of last week another series of tests took place on Hillside avenue, in Jamaica, L. I. These tests were brought about with the co-operation of the good roads board of the American Automobile Association, of which George C. Diehl is the chairman. In attendance were the highway commissioners, or their representatives, from nearly a dozen different States, officers of the Engineering Corps of the United States Army, a plenteous delegation from the Office of Public Roads, and automobilists of national reputation.

While the results were not as thoroughly satisfactory as many wished, at the same time undoubted progress was made in the premises, and the facts adduced will be utilized in arriving at the ultimate result.

Hillside avenue is in a more or less worn-out condition and appears to be a combination of a macadam and gravel road, with frayed sides. Frequently the cars traveled over a part of the real road and the dusty side. There were trials at low speed and high speed, and brake tests, with and without chains and anti-skids, and horse-drawn vehicles entered into the producing of photographic evidence, which was supplemented by the tape measure.

A technical committee composed of Herman Cuntz and Coker F. Clarkson, of the A. L. A. M.; Thos. J. Fay, Jos. F. Anglada and O. A. Stranahan, of the Society of Automobile Engineers, and C. F. Drake examined the cars carefully in order to be able to fix upon the value of the test data, taking into account all the factors that might have bearing on the results. A summary of the observations made by the technical committee will best tell the story, though it will be at the expense of some time, many more tests, and much discussion before the whole story will be told, reaching conclusions of a dyed-in-the-wool character.

There were 36 tests involving speed, taking into account the several makes of tires, and with an idea of judging of the amount of dust raised photographs were taken from all angles. Then the effect on the roadbed was observed by the committee. In the brake tests the White steamer, with tires on the rear wheels in which the word "Firestone" was embossed, had the advantage of excellent traction, and at the same time it was not actually necessary to use chains. In these severe brake tests it was adequately indicated that the tread of the tires was not damaged, although, of course, the tread did indent the roadbed when the steamer, going at 40 miles an hour, came to a dead stop inside of 140 feet, and again when going at 30 miles the car came to a stop in 74 feet.

In the speed trials when chains were applied it was expected that they would do much damage relatively, and it came as a surprise to the observers when it was found that the chains had no such effect at all. As a matter of fact, the chains did not damage the road as much as smooth tread tires when the speed of the car was high enough to cause slipping to a considerable extent. It was the common belief, taking such evidence as was afforded, that under ordinary conditions chains do not damage the roadbed, and when the speed of a car is high, in the absence of some such equivalent as the Firestone tread, the chains would seem to be an actual advantage from the point of view of the maintenance of the road.

On the whole the tests were a little tame during the speed trials, and it was not until the brake tests were innovated that the large party of road builders and automobile engineers essayed to become particularly interested. It was not anticipated that so much good information could be had in the simple process of trying out cars for the purpose of determining the distance in which they could be brought to rest. Nor was it supposed that a mounted policeman going at 25 miles per hour would experience difficulty in stopping his horse inside of 152 feet. But No. 3815 failed to do better, and he made a splendid run of it, being a veteran of the U. S. Cavalry, finely mounted, and a horseman beyond question. This same officer, going at a rate of 10 miles per hour, came to a stop inside of 17 and 12 1-2 feet respectively, as the result of two trials.

The motorcycle test was of interest, and it was also one of the surprises of the day. The motorcycle, going at 40 miles per hour, stopped inside of 157 feet, thus showing that the mounted policeman and the cyclist are about on an equal footing.

The span of horses, hitched to a rig, would not stop in an

orderly manner at all when the pistol was fired as a signal to the driver, but in the absence of the shot the same horses, going at a speed of 10 miles per hour, were brought to a stop inside of 27 feet. The carriage used was a frail affair, and the horses would be classed as a little short of "ginger." As the affair turned out, the horses failed to come to a stop any quicker than the automobiles under the same conditions of speed, as the following tabulation will adequately testify to.

AUTOMOBILE BRAKE TESTS AS MADE BY THE COMMITTEE.

Car.	Miles Per Hour.	Stopping Distance in Feet.
Simplex	20	42
Simplex	30	109
Simplex (empty tonneau)	40	187
Simplex (three in tonneau)	40	146
Simplex	25	70
White Steamer	20	41
White Steamer	25	53
White Steamer	30	74
White Steamer	40	140
White Steamer	10	16
Peerless	20	65
Peerless	28	96
Peerless	40	151
Peerless (steel studded tires)	20	55

One test showed that weight over the rear wheels, when they are the traction members, influences the situation to a considerable extent, in that a car can be brought to rest in a much shorter distance when the tonneau is provided with a weight of passengers. The Simplex car, with the tonneau empty, was brought to rest inside of 187 feet, and the same car with three average weight passengers in the tonneau came to rest inside of 146 feet.

During the dust trials the motor vehicles were operated at speeds of 10, 20, 30, 40 and 50 miles per hour. The Fiat Cyclone and the Simplex "50" were driven at the utmost speed when the condition of the road permitted, and maximum speed of 78 miles per hour was attained by the Fiat and 71 miles per hour by the "50" Simplex. Above forty miles an hour the speeds were most carefully determined by a chronograph operated by Dr. L. J. Briggs, of the Department of Agriculture, Washington, D. C.

While Director Page would not make any official statements regarding the value of the work done, it is believed that the experiments were satisfactory. It is understood that when the photographs have been developed, the moving picture films studied and the mathematical problems figured to a nicety, Mr. Page will issue a formal report from Washington.

Among those who were present as interested spectators and scientific observers were:

L. W. Page, Director U. S. Office Public Roads, Washington, D. C.
Col. Spencer Cosby, Superintendent of Buildings and Grounds, Washington, D. C.
Maj. Jay Johnson Morrow, Corps Engineer, U. S. Army, Washington, D. C.
David Sheridan Stanley, Major Quartermaster, U. S. Army, Washington, D. C.
Lieut. Warren T. Hannum, Corps Engineers, U. S. Army, Washington, D. C.
Vernon N. Pierce, Chief Engineer, Office Public Roads, Washington, D. C.
Dr. Lyman J. Briggs, Physicist, Dept. of Agriculture, Washington, D. C.
L. L. Williams, Official Photographer, Dept. of Agriculture, Washington, D. C.
Roy Crandall, Expert, Dept. of Agriculture, Washington, D. C.
James C. Wonders, State Highway Commissioner of Ohio.
Col. Wm. D. Sohier, State Highway Commissioner of Massachusetts.
Francis A. Price, State Highway Commissioner of Delaware.
P. St. J. Wilson, State Highway Commissioner of Virginia.
Alex. Floyd Armstrong, State Dept. of Highways, Albany, N. Y.
R. D. Beman, Deputy State Highway Commissioner of Pennsylvania.
James Owen, C. E., representing State Commissioner of Roads of New Jersey.
James R. Rablin, Chief Engineer, Metropolitan Park Commission, Boston.
George Lyman Rogers, counsel, Metropolitan Park Commission, Boston.
Jesse T. Vogdes, Chief Engineer and Superintendent Fairmount Park, Philadelphia.
John J. McLaughlin, Chief Engineer Borough of Queens, Long Island.
George C. Diehl, Engineer Erie County, N. Y., and Chairman Good Roads Board A. A. A.
Herman F. Cuntz, M.E., Association Licensed Automobile Manufacturers.
Coker F. Clarkson, Engineering Department, A. L. A. M.
Charles Thaddeus Terry, Chairman A. A. A. Legislative Board, New York.
Frederick H. Elliott, Secy. American Automobile Assn., New York City.
John P. Coghlin, President Worcester Automobile Club, Worcester, Mass.
Fred J. Wagner, official A. A. A. starter, New York City.

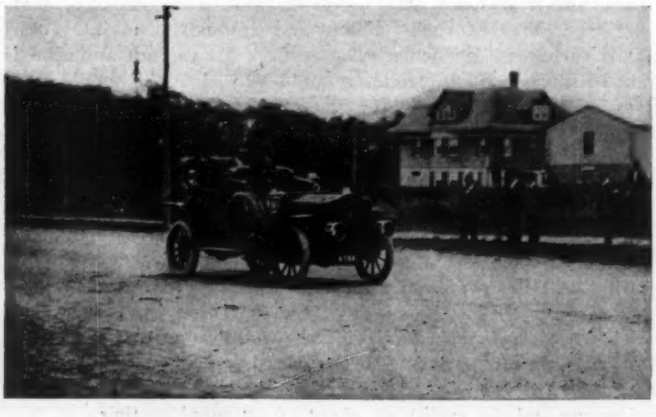
DINNERS "ALL HOT" SERVED A L'AUTO.

PARIS, May 23—How to deliver a dinner all hot from the establishment to a customer's house is a problem that has puzzled many a French caterer specializing in high-class dinners served *à domicile*. The problem is not confined to complete dinners, for every restaurant proprietor has some specialty that he is constantly called upon to furnish promptly, fresh and hot.

The way out of the difficulty was the automobile, and the vehicle most suited to this particular class of work was the Roval, a French production, with its power plant, a single cylinder De Dion, set over the rear axle and transmitting by means of a very compact gear box and clutch to the road wheels through side chains. Such an arrangement left the whole of the vehicle ahead of the rear axle free for bodywork, while at the same time leaving the engine as accessible as if it had been under a bonnet forward. The traveling cook shop is the usual type of Roval car with special heating arrangements. The body is divided into three distinct compartments, reached through the two side and the one front doors, and each one maintained at a correct head by pipes through which the exhaust gases and the cooling water circulate. A sheet-metal lining backed with felt retains the heat sufficiently to assure any of the dishes being carried to customers as hot as when they came out of the oven.

COMMISSIONERS STUDY CLEVELAND ROADS.

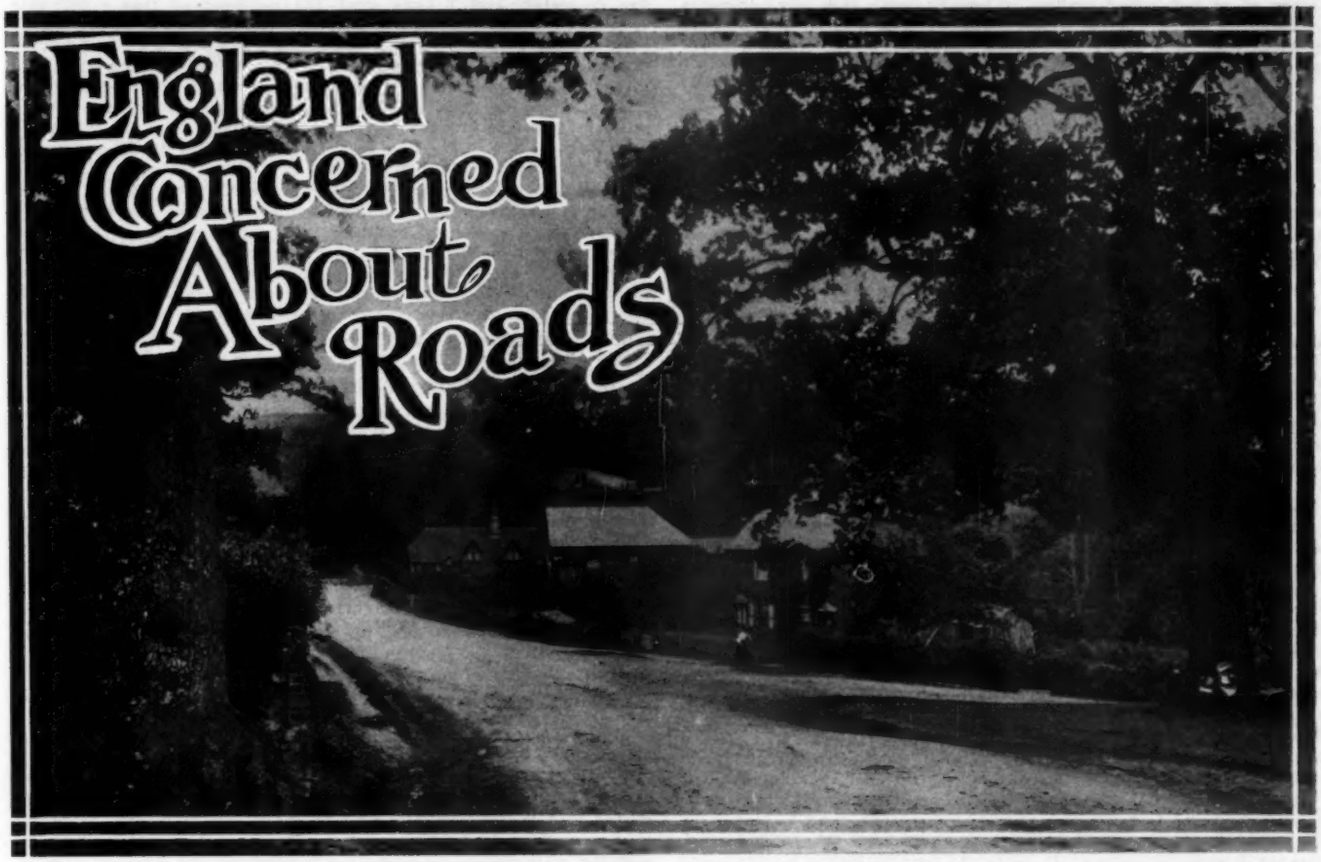
CLEVELAND, May 24—Franklin county commissioners will spend several days in this city next week studying the roads in and around Cleveland, with a view to improving their own along the same lines. While here the commissioners will be entertained by the Ohio Good Roads Federation, of which M. M. Maxwell, well known in automobile circles in northern Ohio, is secretary.



White Steamer in the Brake Test.

Fiat Cyclone Traveling at Speed.

England Concerned About Roads



A Typical Stretch of Highway in the British Isles, Where There Is Much Concern About Road Preservation.

LONDON, May 15—Interest unquestioned was manifest in the National Road Conference, organized by the County Councils Association, and the result of the recent sessions in London indicates that England is certainly concerned about the future of its roads. Papers innumerable were presented, and the subject was attacked from almost every point of view.

Resolutions adopted embrace a system of standardizations to facilitate the collection of facts about roads and traffic; classifications of all roads under the two headings, primary and secondary; increased government grants for the maintenance of all primary roads; codification and consolidation of the highway law; the use of tar and similar means for rendering roads waterproof; power to close roads temporarily to heavy vehicles at times when serious damage would be done by them; legislation to prevent any vehicle from bringing mud on to the roads upon its wheels; additional regulations restricting the weight of vehicles in relationship to their speed, and to the size and nature of their wheels; application of all funds derived from motor taxation to the improvement of the road.

A summary of a few of the most important papers will indicate more than anything else the diversity of the proceedings and the thorough manner in which the entire matter received consideration.

First Damage by Horse-Drawn Traffic: Then the Auto.

The passage of vehicles over a road produces several effects which it is important to distinguish. There is first, the grinding and crushing action of the wheels and horses' feet on the surface; secondly, the effect of the load in giving rise to bending and cross breaking strains throughout the whole thickness of the road coating.

Another damage that has now to be met is the scrubbing off of the road surface owing to fast motor traffic.

Almost the whole of this damage results through the roads beins constructed of a water-bound granite, which in itself must of necessity be to a large extent friable.—[Albert D. Greatorex, M.I.C.E., Borough Engineer and Surveyor, West Bromwich.]

A very simple and decisive demonstration could be made to settle the question whether it is horse traffic that acts primarily and directly in disintegrating the highways. Let a short loop be made at a convenient place where the road is frequented by horse and autocar traffic. Let both sides of the loop be laid down exactly in the same way, and direct each class of vehicle to use one side of the loop only. I can say from my own experience that the result is certain. Where I live in summer there are two avenues. On one there is practically no horse traffic, and the autocar tracks are smooth and free from holes. On the other there is daily horse traffic—railway and tradesmen's carts, etc. On that avenue holes are constantly forming and have to be filled up. One can watch from day to day the formation of these holes by the picking and crushing action of the horseshoes and narrow metal tires.—[The Right Hon. Sir J. H. A. MacDonald, K.C.B.

In the first place the greatest creators of dust may be taken to be the hoofs of animals. Although wheels cerate dust also, even when rolling over the road without exerting any propelling force, they do not make dust to anything like the same extent.

The second most potent creators of dust are narrow-tired, heavily-laden carts.—[The Right Hon. Lord Montagu of Beaulieu.]

Use of Various Surface Preparations.

To cope with the dust nuisance, surfaces have been sprinkled with calcium chloride solution, and, although the nuisance has been somewhat minimized, the success has not been great. On each section of road that has been sprinkled in the manner indicated it has been noticed that the surface has worn into holes more rapidly than the adjoining surfaces which were not sprinkled.

With the present experience the author is of opinion that tar spraying or painting the surfec of a road well constructed with hard stone on a strong foundation promises the best and most economical results, both in the matter of dust abatement and suitability for modern traffic. Waterproofing the roads in this manner enables the camber of the road to be reduced to a minimum. Care should, however, be taken to properly construct the road with hard surface material on a sound foundation, and to tar the surface before it has been worn into holes or depressions, as it must not be expected that tarring of the surface will convert a bad road into a good one.—[Geo. A. Phillips, A.M.I.C.E., County Surveyor of Glamorgan.]

Taking into consideration the items of utility and cost and the facilities for construction and repair, the author is of opinion that of macadamized roads, one constructed with good stone (water-bound) on a proper foundation, and the surface properly coated with hot coal-gas tar, is the best. The sаytem of tar-spraying roads by machinery has greatly facilitated and reduced in cost what the author considers one of the greatest boons conferred upon the

users of macadamized roads. It lessens wear and tear, prevents damage by suction of pneumatic tires, reduces dust to a minimum, reduces mud, and generally increases the life of the road.—[Henry E. Stilgoe, M.Inst.C.E., Birmingham City Engineer and Surveyor.]

It may be safely said that the best method by which the effect of these dust-creating agents can be counteracted is to make the road waterproof, and the cheapest way to make it waterproof is to tar it. If, therefore, it is possible to lay tarred material at the start, that plan is the best of all. But if not, a coating of tar is the next best thing. The complete removal of dust from our roads is, from an engineering point of view, perfectly practicable, and the only problem now is one of cost.—[The Right Hon. Lord Montagu of Beaulieu.]

Sucking Action of Pneumatic Tires Not Proven.

It is necessary here, therefore, to point out that what is called the "sucking action" of pneumatic tires has never been proved to exist. Certain portions of the Great North Road, which two years ago showed grooves due to the action of the studded tires, since they have been repaired and tar sprayed to a sufficient depth to ensure the tar penetrating ¾-inch from the surface, now at the same places show no sign of grooving. At the same time, I deprecate the use of steel-studded tires. The crushing pressures and the forces of impact of pneumatic-tired wheels are so low that little is gained by increasing their diameter. It is fortunate that this is the case, as increasing the diameter of rubber-tired wheels is a very expensive luxury.—[Col. R. E. Crompton, C.B., R.E., M.I.C.E., M.I.E.E.]

On surfaces which have been treated with tar, or are made of a hard, unyielding material, the motor car wheel causes practically no damage, and it should produce no appreciable wear compared with steel-tired wheels. A steel-studded tire is, however, far more destructive in its effect than an ordinary plain rubber tire. But as long as dangerously skiddy surfaces exist it would be undesirable to absolutely prohibit the use of a metal-studded tire.—[The Right Hon. Lord Montagu of Beaulieu.]

Advocates of Increased Wheel Diameters.

It appears likely that the only practical method of reducing these crushing strains is by increased wheel diameters, and by reducing the axle weight by dividing the load carried or propelled over a greater number of axles.

With modern wheels made of iron or steel, the weight of the wheels for equal rigidity, durability, and strength increases only as the diameter, and I hope that the removal of this error may encourage designers to increase the wheel diameters in future road vehicles.

The question of the springing of road vehicles running at a high rate of speed remained until recently a mystery confined to a few coachbuilders, but, thank to Mr. Lanchester and others, the science of springing, and of the location of the vehicle so as to obtain the best results, has received a great impulse.—[Col. R. E. Crompton, C.B., R.E., M.Inst.C.E., M.Inst.E.E.

There is not the slightest doubt that a light car is the coming vehicle for all purposes, but before the weight of the car can be appreciably reduced, the condition of the roads must be improved. A better road surface will render unnecessary the extra weight called for to resist the shocks of defective roadways. To obtain this and the most economical rolling contact between the wheel and the road, the skill of the two different people concerned is required.—[Sidney H. Chambers, Engineer and Surveyor, Hampton Urban District Council.]

All Users of the Road Should Pay Their Share.

The remedy is not to be found in returning to the exploded system of taxing the actual wheels that pass over the road surface, and the enemies of motors will be well advised not to press this contention too far. If those who use the roads and those who destroy the roads are to pay for them, it may well be found as the result of a scientific inquiry that the tax will fall with overwhelming weight upon the horse-drawn vehicles, which seem now to flatter themselves that they have some exclusive right to destroy the roads uncriticized.—Earl Russell.]

Necessity for a Central Government Supervisory Department.

It is submitted that these considerations show the absolute necessity for a central government supervisory department, or, perhaps, a specialized branch of the local government board, whose duty would be to inspect the main roads throughout the country and satisfy themselves (a) that those roads are maintained at a proper standard, and (b) that the standard is obtained by the most efficient and economical methods.

Since it appears that the chief defects in the existing system are capable of improvement by cmparatively simple means, it is submitted that the county, aided by the purse and inspected on behalf of the government, would form the most convenient and experienced unit for main road administration throughout the country.—[F. H. Berryman, Chairman of the Highways Committee of the Somerset County Council.]

GERMAN STATISTICS NOT ASTOUNDING.

BERLIN, May 20—According to figures up to January 1, 1909, there were the following number of motor vehicles in the German Empire on this date: 39,475 vehicles, used principally for conveyance of persons, among these being 20,928 motorcycles; 9,434 cars of up to 8 horsepower; 5,441 of up to 16 horsepower; 3,595 of 16 to 40 horsepower, and 77 of 40 and more horsepower. There were further 2,252 vehicles principally used for the conveyance of goods; 248 of this number were cycles; 1,035 cars up to 8 horsepower; 502 from 8 to 16 horsepower; 448 from 16 to 40 horsepower, and 19 of 40 horsepower and more.

Of the vehicles used for the conveyance of passengers 395 were in the service of public departments, such as post, army, navy, home, etc., offices; 2,340 were public conveyances (cabs and omnibuses); 16,110 served industrial and commercial ends; 427 were in agricultural usage; 4,641 were used by other professions (medical, land surveying, etc.) and 15,562 for sport and private use, a figure that seems intolerably small to English and American ideas.

The goods vehicles are divided as follows: 143 in the service of public departments; 2,059 for commerce and industry; 24 for agricultural purposes and 26 others not classified.

The Austrian voiturette reliability tour of the Austrian Automobile Club on the Vienna-Trieste-Klagenfurt-Vienna route, May 6 to 9, brought another victory for the Opel cars, as the only one entered and driven by Koch forged ahead early in the event and eventually landed in Vienna far ahead of all competitors. The very difficult first day's run of 500 kilometers knocked several vioturettes out of the competition, but all those that arrived in Trieste held out to the finish. The team prize went to the Austrians, which came in third, fourth and fifth.

AUTO NEWS MADE IN GERMANY.

The guarantee fund for the Frankfort Aeronautic Show has now reached a million marks; a sum of 13,000 marks has been presented by various persons for prizes.

The first speed trial of the Prince Henry Tour will be held on the flat between Guben and Krossen, over a stretch of six kilometers. The road leads through a forest, has hardly any intersecting paths, and no traffic worth mentioning.

The Prussian War Ministry has bought a large territory on the Russian frontier on which to erect a balloon station. The news that Metz is to be the home of one of the Parsevals has aroused much activity in France, and it has been decided to construct two sheds on the other side of the black and white sign posts, one at Nancy and the other at Epinal. The easily aroused Frenchmen are much disturbed over the incident.

The German commercial car trials have come to a successful end at Stuttgart, while the military vehicles will return to Berlin by road. The last stages passed over so quietly that the daily official reports only dealt with the roads taken and the exhibitions at the various industrial centers the cars passed through, and this in spite of the tortuous roads South Germany is so rich in. All through Baden and Durttemberg road men were posted at every wayside stone with pencil and book, the authorities being so much on the alert that they gave rise to a much laughed at incident. At Freiburg a police official was sent out with a bell to cry out the news that the great motor race would pass through the town that morning and parents had best look after their children. The race idea spread by police headquarters at Karlsruhe reached over to Baden-Baden, as at the Oos cross-roads numbers of smart motors were pulled up to watch the "race," and when the heavy monsters came lumbering into view disappointment was rife.

NECESSITY OF STATE GOOD ROADS ASSOCIATIONS

By GEORGE C. DIEHL, Chairman Good Roads Board, American Automobile Association.

THE importance of State good roads associations is not appreciated in the majority of the States throughout the country. This is especially true in the States which have built a great many miles of roads with State aid. In many States the only good roads organizations are those which are composed entirely of the motorists. While the motorists, consistently supported by the Association of Licensed Automobile Manufacturers, the National Association of Automobile Manufacturers and the American Motor Car Manufacturers' Association, do not begrudge the time which they spend in these organizations, they feel that more valuable results could be obtained by having associations representative of not only the motorists, but of the farmers, the county commissioners, county boards of supervisors and the minor highway officials throughout the States.

Such organizations permit the chief highway officials of the State to keep in touch with public sentiment, and disseminate the knowledge gained through the experience of such officials. They also act as a check upon the chief highway officials when inclined to follow unwise counsels. These State associations should meet regularly, and suggest the proper form of new highway laws and desirable amendments to the existing statutes.

These State associations should meet regularly, and suggest the proper form of new highway laws and desirable amendments to the existing statutes.

Two important subjects which State highway associations could properly urge are:

First—The construction of permanent masonry bridges.

Second—The improvement of town or lateral roads.

Bridges—Few of the States aid in the construction of bridges. The entire burden of construction must be borne by the township or local municipality. The result, in sections where bridges are numerous, has been that inferior structures have, owing to lack of funds, been erected. The type usually adopted in such cases has been a light iron or steel superstructure, with plank flooring and railroad-iron pile substructure—or poorly laid rubber abutments. The life of such bridges does not exceed usually thirty or forty years, and if not promptly replaced they constitute a menace to all users of the highway. The usual renewals consist of placing an inferior iron or steel bridge over the old weakened foundation.

The local highway officials not having technical training are frequently misled or corrupted by unscrupulous agents. The bridges constitute an absolutely essential part of the highway and should be erected under State supervision and in part at least at State expense, with the result that in place of weak and inferior structures, solid, attractive and durable concrete bridges will be erected, as an enduring monument to the highway officials in charge of such work.

Concrete Bridges—The cost of erecting a reinforced concrete bridge is little, if any, in excess of the cost of a properly designed steel structure. The cost of repairs and maintenance of concrete bridges is nothing; consequently they endure for ages. Such structures are attractive in appearance, safe at all seasons, pleasing to the eye and eliminate probability of accident.

Town Roads Materials—So much has been said about brick, stone and macadam pavements that the fact that the vast majority of roads must for many generations be dirt roads, is rather lost sight of. By proper care and supervision, under appropriate laws, these roads can be made, for the greater part of the year, almost as satisfactory as hard-surface roads. To show the impossibility of macadamizing all of our roads in one generation, or in any limited period of time, it is sufficient to say that there are over two million miles of roads in the United States; macadamizing costs not less than $5,000 a mile, and usually more than that. At the lesser cost the aggregate expenditure to improve all the roads in the country would be 10 billions of dollars, or a hundred million of dollars a year for 100 years.

The main roads, upon which traffic is heaviest, and which accommodate the greatest population are estimated to be less than 10 per cent. of the whole. The ultimate improvement of these main roads can be reasonably anticipated, if public sentiment is properly aroused.

Improvement of Main Roads—This should not take all the energy and appropriations, but should go forward hand in hand with the improvement of town roads. In some localities for many years the entire amount of highway taxes, whether payable in cash or labor, has been expended in temporary work; while nothing has been spent for permanent improvements, with the result that the condition of the town roads remains unchanged. The roads in some places are no better to-day than they were 50 years ago, notwithstanding the labor and money expended.

There is annually expended on the town or lateral roads of the country $55,000,000 in cash and $20,000,000 in labor. To secure a proper improvement of the town roads it is necessary to abolish the labor tax which is in vogue in about 35 States and to substitute a money tax. It is also necessary to spend a certain amount each year for permanent improvements, in order that each year may see constantly improving road conditions. Many local officials are inexperienced; it is desirable to have the chief highway officials of the States advise and superintend the work done by local officials upon the town roads. Such supervision implies that there should be State aid in cash for town roads.

Under such circumstances it is not difficult to enact fixed rules and regulations which can provide in most cases that not over one-half of the town highway tax shall be expended for highway repairs and maintenance and that the other half shall be used to construct permanent improvements.

Under such a system, in addition to such State and national aid as public sentiment might enforce, there would be expended for permanent betterments about forty millions of dollars annually on the lateral roads through the counties.

The more important lateral roads connecting with the main State roads should be first improved. We must have a steady increase in total mileage of improved roads, main and lateral.

ROAD IMPROVEMENT EVER THE PARAMOUNT ISSUE

By G. VERNOR ROGERS, Secretary American Motor Car Manufacturers' Association.

WITH the coming Spring and renewed touring, the matter of good roads is once more, and more forcibly than ever, a paramount issue with the automobilist, horse owner, the farmer, the pedestrian and, above all, the country school children who have to travel considerable distances from their homes to the district schools. Again has the fact been thrust upon us that the greatest and wealthiest of all governments—the United States—is far behind foreign countries in good road building. The whole country is stirred as never before, relative to this great question of highway improvement. If there is anything in the world that a good citizen who loves his State and that his civic or State pride delights in, it is to have the city and the State reputation maintained.

To-day the finger is pointing as never before to the attitude of the States toward this question; and a State's reputation for enterprise, progress and all that goes to make it worth living in, is determined very largely by the character of its roads—the arteries through which flow the business and pleasure life of a State.

Whenever a farmer loads his wagon he has in mind the worst part of the road over which he has to go, whether that be one or five or six hundred feet long, or has a hundred feet or a hundred miles of good road at each end. He knows that its worst hill or mud hole limits the size of the load he can haul.

Because this is so, every bit of road connecting those on which state money has been spent should be made so good that no mud holes, steep grades, no "worst spots," in short, will be left to limit the wagon-load to less than can be, without difficulty, hauled the entire length of the system of improved roads. There should be no breaks in this chain; no interruption in these great arteries through which flows our industrial life.

The Country Life Commission recently appointed by President Taft, in its report to Congress, makes many interesting statements which, if adhered to, will ultimately result in universally better roads in this country.

The demand for good highways is general among the farmers of the entire United States. Education and good roads are the two things most frequently mentioned by farmers. The Commission in its report says: "We hold that the development of a fully serviceable highway system is a matter of national concern, co-ordinate with the development of water ways and the conservation of our native resources. It is absolutely essential to our internal development. The first thing necessary is to provide expert supervision and direction and to develop a national plan. All the work should be cooperative between the federal government and the states. The question of federal appropriation for highway work in the United States may well be held in abeyance until a national service is provided and tested. We suggest that the United States government establish a highway engineering service, or equivalent organization to be at the call of the states in working out effective and economical highway assistance. That highway improvement is the most important economic reform, has long been urged by the farmers, who, through their principal organization, the National Grange, have been persistently agitating for the adoption of a policy of federal aid for good road construction and maintenance."

The declaration by the Country Life Commission that the establishment of a fully serviceable highway system is a matter of national concern, absolutely essential to our internal development, should serve to hasten the enactment of legislation, provide for the creation of a National Highways Commission, and make liberal appropriations for carrying on its work. This is in full accord with the desires of the American Motor Car Manufacturers' Association which has already contributed a considerable sum of money toward the betterment of good roads in this nearly up-to-date country.

The need for a new kind of country school cannot be met, so long as our dirt roads, which at certain seasons, are almost impassable, prevent the attendance of the farmer's children at centralized schools where they can have all the advantages of a graded school in connection with a high school. Central schools of those kind are now being established in some sections of the country, where good roads permit of the pupils of the entire township being transported to them daily from their homes, and with the extension of improved roads, its school system would become general. In this way, better roads mean much higher education for the country children, a wholesale blessing.

TOURING BECOMES A NATIONAL HABIT

By S. D. WALDON.

AN epidemic of touring is over the land. Largely as the result of the work of the pioneer American manufacturers, constituting the Association of Licensed Automobile Manufacturers, the one-time boulevard autoist now seeks enchantment on the broad country road. He rolls from asphalt to macadam, from macadam to gravel, and from gravel to dirt.

There are now over two hundred thousand motorists in this country. Joyously they take to the wandering ways, among tall shade trees, in the midst of green garbed hills and stone-empaled valleys, or free on the open prairie, in mountain fastness or out on the desert lands.

Many a man who has driven his car around the four corners of his own and neighboring States could not tell you the name of the winner of a Vanderbilt cup race. But these tourists take thousands of roads in scores of kinds of cars and have tens of thousands of stories of pleasant autoing experiences to tell. Collectively, they represent one of the greatest movements for countrifying city-tired denizens.

Individually, the tourist, despite the serious import of the part he plays, if often interesting. He is essentially a modern highly-developed man, taking no part in the spectacular features of autoing. Few accomplishments have created as much general interest as the recent Pacific to Atlantic trip of a business man and his family, five in number.

The intent of many miles of travel does not rob them of their enchantment or of the pleasure afforded by the many shifting scenes. There is always to be encountered a fresh picture; some tourist trying out the roads in a new way.

The road ahead, say, winds recklessly along the crown of a ridge to where the sky, coming down, blue and fluffy, meets the Alleghanies going up, dark and solid. Or the road turns and ends in a wall of underbrush. It comes out of the forest from above, but the connecting link between the path under-wheel and the one sticking out of the trees to the very top of the mountain is lost. So is a moving picture halted by cutting out a strip of the endless film.

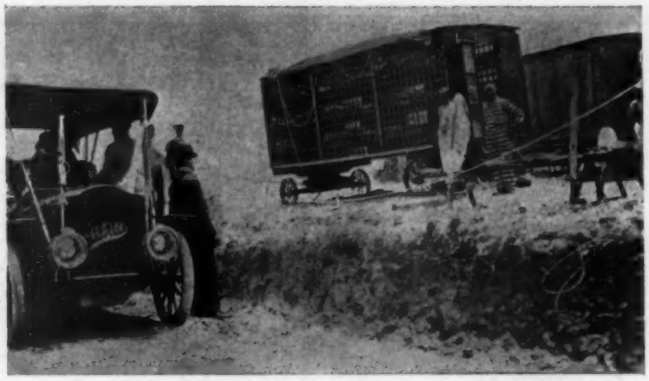
Thus the autoists go. Some bold, some timid; some fast, some slow. Every mile of their many pourneys is crowded with incident, like a long story which upwinds, chapter after chapter, always telling something new.

It is all a part of experience, which, multiplying, will dot the landscape with automobiles. Thus we are making a new national habit and yet, we hope, a lot of national pikes. Which is the most beneficial to the country as a whole is hard to say.

MARYLAND MAY EMPLOY CONVICTS ON ROADS

BALTIMORE, May 10—Convict labor will be used in constructing good highways in this State if the efforts of Governor Crothers, backed by the Democratic party, are successful. The chief executive will request the next General Assembly to pass a law making it permissible for prisoners now incarcerated in the Maryland penitentiary in this city, the house of correction, and the county jails to do this work. This is in line with Governor Crothers' economic ideas of roadbuilding. While the last Legislature authorized a loan of $5,000,000 for improved roads in the counties and this city, it now looks as though it will be necessary to ask the next General Assembly to make another appropriation of $6,000,000 to complete the work mapped out by the Good Roads Commission. The Governor believes that the employment of convict labor, together with the revenues to be derived from the proposed tax on automobiles, leases on oyster beds, inheritance taxes, and a probable income tax, will enable the State to satisfactorily meet the interest payments on the present loan and any other loans that may be granted in the future. So is the cause of good roads forwarded all over the country, each State, county and township, in its own individual way, furthering the same end.

Georgia Convicts Cutting Road Through Solid Rock.



Convict Sleeping Wagon Near Lawrenceville, Ga.

GEORGIA NOW SEES THE NECESSITY FOR REAL ROADS

ATLANTA, GA., May 20—Traveling steadily for nearly five days and covering 490 miles in that time, the White Steamer, scouting for the Atlanta *Journal,* rolled back into Atlanta after having threshed out with extreme care some proposed routes for the New York-to-Atlanta endurance test.

This last day's run will presumably cover about 120 miles and will carry the tourists from Greenville, S. C., to Atlanta. Using this run as a basis the scout car worked out with no small difficulty the routes to Atlanta, which are two in number.

The limiting of the number of routes is the result of a typically Southern condition of affairs—a lack of bridges. To go from Greenville to Atlanta the Savannah River must be crossed. And on anything like a direct line between the two towns there are just two ways to cross—by a ferry on the south route and by a bridge on the north.

In threshing out these two ways between Greenville and Atlanta the scout car cruised about for five days, tackling roads of all sorts, from highly polished macadam to lumpy, gullied, rocky, steep side-hills with only faint tracks indicating where a road was supposed to be.

The first day's run was from Atlanta to Lavonia and was without event save that at every town on the route the citizens and city officials—mayors and councils, ordinaries and extraordinaries, sheriffs and convict keepers—turned out to welcome the car and to show cause why the run from New York to Atlanta should come directly through that town. The enthusiasm was in no way short of marvelous. Little towns where perhaps not more than an automobile or two was owned would turn out with the two cars to meet the scout and escort it into the city limits, where there would be a brass band to welcome the delegation and a general outpouring of citizens.

"What do you want done to our roads?" was ever the question, and by taking road commissioners and road builders out in the car and showing them exactly what was needed a lot of great educational work was done. Georgia has convicts on the roads at last and is prepared to do vast amounts of road building. Intelligent directions are now the only things needed.

From Lavonia the car went first to test the Knox Bridge over the Tugalo River. This was found to be in good condition. Then the machine doubled back over another route toward Atlanta, then turned again at Commerce and went straight to Anderson, S. C., where the second night was spent. The Savannah River was crossed at Brown's Ferry.

This ferry is an antiquated bit of machinery—a flat-bottomed craft, just big enough to hold one automobile. At each end of the boat is fastened one end of a long cable. This runs through pulleys fastened on each bank. When the boat is pushed off it is fastened at such an angle that it crosses the stream as a result of the action of the current—after awhile.

A little mathematical calculation shows a bad defect of the route that includes Brown's Ferry. It takes 30 minutes for each round trip and only one car can be carried over at a time. It takes but six hours to run from the west side to Atlanta. Therefore if each car got away immediately after it was ferried across the first car would be in Atlanta when the thirteenth was getting over the river. If there were as many as 30 cars in the run the last one would not be across by dark if the first one started by daylight.

The third day out the car doubled back from Anderson to the river, this time examining the South Carolina side of the route to Knox Bridge and then doubled again and returned to Anderson by another route. From that point the car went straight on to its most northeasterly destination—Greenville.

The return trip was made in two days. On Monday the White ploughed its way over hills and down terrible grades through the shank end of the Blue Ridge, across Jarrett's Bridge and to Gainesville, Ga. Then it had an easy home run.

"Herald" Scout Car Leaves New York

NEW YORK CITY, May 25—To lay out the route of the proposed endurance run from this city to Atlanta, under the auspices of the New York *Herald* and the Atlanta *Journal,* R. H. Johnston and a party in his White steamer started Southward this morning. They expect to travel via Philadelphia, Gettysburg, and Staunton, Va., stopping overnight in each of these places, and will continue South wherever the roads are best. There is an Oldsmobile traveling northward, and when the two meet the Olds will turn and both work towards the southern terminus of the contest. This route is a tentative one, and may be changed if some other itinerary in the South proves more acceptable. With Mr. Johnston were Major John S. Cohen, managing editor of the *Journal;* Nathan Lazarnick, the photographer, and Hamilton Peltz, of the *Herald.*

Georgia's Substantial Auto Enthusiasm

ATLANTA, GA., May 22—At a meeting of business men and automobile enthusiasts at the Atlanta Chamber of Commerce, May 22, $100,000 was subscribed in ten minutes toward the $225,000 necessary to build Atlanta's two-mile auto track. Already land has been purchased near Atlanta and work will be started at once. It is proposed to have the track, grand stand and whole plant finished by November and to have the first race meeting of any importance take place at that time. Thus, a race will be pulled off as quickly as is possible.

Georgia's eight endurance runs to Atlanta in November, all so timed as to bring the cars to the city just before the automobile show, promise to be notable events well worth racing in. Already $5,000 has been hung up in prizes for cars and roads. The scheme was started by the Atlanta *Constitution* and that paper put up $2,500. Other donations have been: Fitzgerald, Ga., $1,000; Savannah *News,* $500; Savannah Automobile Club, $500; Atlanta *Journal,* $1,000.

With Dai Lewis in Laying Out the Route of the Big A.A.A. Tour

A Visit to the Hennery

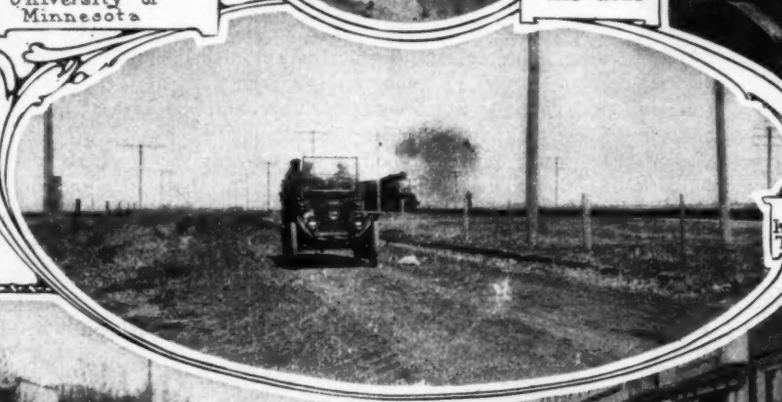
Across the Platte River Nebraska.

Nebraska has some good roads

The E.M.F. Pathfinder passing the University of Minnesota

Garden of the Gods

Lewis finds a New Friend



Two kinds of Travel

Nebraskans greet the Pathfinder

In Sight of Pike's Peak

GLIDDEN PATHFINDER WILL SEEK NEW ROUTE TO OMAHA

THOSE automobilists who expect to participate in the Glidden tour of the A. A. A. this summer have been calling for the most strenuous test yet held, but at the same time they will want roads which are passable. Inasmuch as parts of the route mapped out by Dai H. Lewis, the pathfinder in the E-M-F touring car, were well-nigh bottomless, it has been decided that a different course should be taken. According to directions from Chairman Hower, the E-M-F was shipped last week to Minneapolis after having completed a circuit to Kansas City, and a new direction towards Omaha will be tried. The Iowa gumbo on either side of Fort Dodge, extending northward into Minnesota, was such that ofttimes the pathfinder could hardly move, and this condition must not be when the tourists are on the road. Therefore, it is possible that the car will go directly south from the Twin Cities to Mason City, and diagonally across Iowa, but even the direction remains to be seen. It is not known whether Fort Dodge will be touched or not, although Mr. Lewis says that he does not like to cut off places where he was royally entertained, and where even the farmers went out on the roads ahead of the car, and tried to improve them so that some headway could be made.

After several exciting experiences in southeastern Colorado and in Kansas the car reached the terminus of the route, but under difficulties, for rain, snow, hail, and washouts interfered. The weather in that part of the United States cannot be depended upon, and according to best authorities the fact that roads in the East are better in summer than in winter or spring does not guarantee that such will be the case in Iowa next July. The route which will be examined within the next few days by Lewis will follow a ridge of higher country than the route tentatively selected early in the month. It is also very hilly, and more picturesque on that account, and Mason City is said to have better hotel accommodations for such a large party than has Mankato. The outlining of the route has not been the only matter which has given the authorities concern, for they are constantly being besieged by enthusiastic autoists of the Middle West, who want to entertain the party as it passes through, and who want to have the night stops arranged to occur every few miles. Council Bluffs and Omaha had a very spirited contest, but it is likely that the latter city will be chosen. In Denver the pathfinders were tendered a banquet, which was attended by Governor J. H. Shafroth, Senator T. M. Patterson, Senator John S. Irby representing Mayor Speer, and many officials prominent in State and city affairs. The car was met on the outskirts of the city and a parade of 147 automobiles made up to escort it through the streets.

FROM MAKERS, BUT INTERESTING TO USERS

FRANKLIN ENTRIES IN THE GLIDDEN.

Editor THE AUTOMOBILE:

We are forwarding you herewith a statement showing the position of the Franklin company in regard to the making of a conditional entry of Franklin cars for the Glidden Tour.

H. H. FRANKLIN MFG. CO.

The fact that the entry of four cars for the coming Glidden Tour has been made conditional by the H. H. Franklin Manufacturing Company places emphasis upon the growing effort to secure stricter rules and more rigid enforcement for this event. It specially brings out one matter in connection with the schedule of daily running time.

It is insisted by the makers of the Franklin that if these cars are to participate in the tour the time schedule for the daily runs shall be unalterably fixed before the start of the tour instead of being revised from time to time during the tour at the wish of some one whom those in charge may see fit to listen to. It is urged that a fixed schedule is fair to all and that, on the contrary, it is favoritism to change the running time when weather changes produce road conditions which some of the cars are by reason of their construction much less able to cope with than others. The Franklin company wants all to take conditions as they come, sharing alike and letting the results accentuate the difference in what the several cars are able to do.

The authorities are also called upon to fix in advance of the tour the deterioration rules and leave them unchanged up to the finish, each regulation being given specific interpretation in advance so that there may be no conflict of opinion later. There is determined opposition to the possibility of a committee watching part or all of the actual performance of the cars in the tour before deciding what the relative penalization shall be for the various items of deterioration.

These calls for specific and rigidly enforced rules are a part of effort which has been made to have penalization provided for defects and deterioration of every part of the car, including tires, brakes, carbureters and clutches.

THAT GAETH PENALIZATION IN BALTIMORE RUN.

Editor THE AUTOMOBILE:

We note in connection with your published statement of the Baltimore reliability run, in the miniature tonneau class, that you had the Gaeth penalty consisting of 45 points due to leaky gasoline tank and exhaust pipe.

Our Baltimore agent, F. W. Sandruck, advises that the total penalty was only 12 points, due to the breaking off of rear muffler pipe, and we wish that you would take the opportunity as soon as possible of publishing this correction and stating the fact as above.

We hope you will appreciate the situation, as an incorrect statement in a matter of this sort creates a very bad impression.

THE GAETH AUTOMOBILE COMPANY,
L. E. STONE, Secy. and Treas.

LOZIER GEAR REDUCTION AND DIRECT DRIVE.

Editor THE AUTOMOBILE:

The deduction which you make from the official statistics of the One Gallon Contest in the last number of THE AUTOMOBILE are quite interesting, but we wish to set you right on an assumption you have made regarding the gear used by the writer on the Lozier 6-cylinder car which won first place in the big car class, and third place in the contest—we refer to the following statement, viz.:

"The Lozier figures back to less than 300 engine revolutions if the high gear was used. As this very slow speed of the engine would not be an economical one, it is doubtless true that the driver of this car pinned his faith to a lower gear than the direct drive, figuring that the other economies attendant upon this would offset the transmission losses on the indirect speed."

The official table gives the gear reduction of the Lozier car 2.4 to 1. As a matter of fact, this is the reduction of the fourth speed, but which, as a matter of fact, is an indirect gear, the direct drive to which you refer being the third speed, and which is generally used in touring and in speeding up to fifty-five miles per hour.

The direct or third speed with a gear reduction of 3 to 1 is the gear which was used from start to finish, and this gear was not shifted, except in three or four cases, when the fourth or indirect high gear of 2.4 to 1 was used on level stretches or down hill.

As you state, it would be natural to assume that the slow speed of the engine would not be an economical one, but as a matter of fact, at the average speed of thirteen miles an hour, which was maintained during the run, the speed of the engine varied from 400 to 750 revolutions per minute.

We may be pardoned for stating that the performance is all the more remarkable through this fact, as the official statistics show that the car had the greatest windage, had the highest-powered motor, and carried the largest live weight of any car in the contest.

LOZIER MOTOR COMPANY,
C. A. EMISE.

The amended facts as set forth by Mr. Emise above show that the engine speed figured from the gear reduction of 3 to 1 would be 367 revolutions per minute average, and not 400 to 750, as he states.

This year's international automobile conference takes place June 15 at Vienna, when the Austrian Automobile Club will play the part of host. About thirty delegates are expected, and they will be in time to join in the festivities in honor of the Prince Henry Tour, which is booked for Vienna on this date. Much interest is being aroused as the time draws near.

THE AUTOMOBILE

Vol. XX. Thursday, May 27, 1909 No. 21

THE CLASS JOURNAL COMPANY

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FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

TWO KINDS OF TRAFFIC THE TROUBLE.

In the recent good roads conference in England a number of points were brought out which were so well taken as to compel attention. One of them dealing with the subject of road surface erosion, as brought about by rapidly passing automobiles, is that the fundamental idea of using the same roads made in the same way for two radically different kinds of traffic, such as the horse-drawn and the self-propelled, is wrong.

The discussion brought out good and sufficient reasons for this as follows: The horse, by means of the caulks on his shoes, loosens the surface into a number of small heaps of material, and the narrow-tired vehicle adds to the wear and tear, which the fast-moving automobile then scatters and carries along. The latter at any rate, and regardless of how it is done, disperses all of the loosened surface material, but does no further damage.

Reasoning from this, the present remedy,—impossible of course,—lies in the segregation of traffic into self-driven and horse-drawn, on roads reserved for each, and built each for its particular service, this being continued until the rapidly decreasing horsed traffic is reduced to a minimum, in which case the road reservation would no longer be necessary.

In the manner set forth, the surface of the horse road would remain in the position in which the horse left it until another vehicle rolled it back into place, with the result that nothing would be lost. So, with the automobile road, the surface would not be cut up into dust for the rotating wheels to distribute over the landscape, because the road being made specially would be oiled or otherwise surfaced for the service which it had to undergo.

* * *

A LESSENED NUMBER OF CYLINDERS?

Following the extreme swing of the power and number of cylinders pendulum of two years ago, toward the maximum and approaching what was once facetiously called "road locomotives," there is something of a tendency to-day toward the other extreme, the backward swing of the pendulum.

This was first apparent in the foreign market. Not only were cab chasses brought out in large numbers powered with the despised (of two years ago) two-cylinder engines, but also numerous private cars of small sizes. Following the lead of the Continental engineers, English makers took up the same trend, but more conservatively. Now, time having shown the wisdom of this policy in the success of the two-cylinder cabs plying in London, the makers of the Isles are about to throw conservatism to the winds and go deep, very deep, into the lowly two-cylinder vertical engine.

And what has been done in this country in the same line? how many cars of this type are to-day to be had in the open market, and what progress in experimentation is being made? This is best answered in figures. There are five American makers putting out engines with less than four vertical cylinders, but of these two are two-cycle and one air-cooled, which reduces the number to two, and both the product of the same engineer.

Seeing, then, that the American maker is apathetic toward this important question, let a few of the real and very apparent advantages be brought out for inspection, taking, for example, the two-cylinder engine. Poor balance mechanically is urged against it, but, in the light of modern progress in and fuller knowledge of the art of balancing, it would appear as if this one prominent disadvantage has been looked at so long that it appears out of all proportion to its importance. It is true that the two-crank two-cylinder engine has an irregular turning effort, but the two-cylinder single crank motor has not, as the explosions occur at regular intervals. With this arrangement, much used on aerial engines, the matter of balance reduces to one of compensating for the extra piston and connecting rod; surely not a difficult task.

There have been a number of reports of cars projected for the season of 1910, and these have included various engines differing from the regular four-cylinder, now general, but not one of those advanced has included the motive power discussed above, namely, the two-cylinder. If old-established houses with fame and prestige like Panhard, De Dion, Renault, C. G. V., and others in France; Adler, Laurin-Clement, Opel, and others in Germany; Siddeley, Napier, Arrol-Johnston, Humber, and more in England; to say nothing of Zust, and cars of similar quality elsewhere, if these firms can build and sell a two-cylinder vertical engine without damaging the reputation of years, but rather enhancing it, what have the American manufacturers to fear in following their lead? Surely here is the chance to capture the medium-priced trade of America's numerically great middle class.

OLD BAY STATE WILL HAVE AUTO MANEUVERS

BOSTON, May 24—When word is received by the Massachusetts military authorities some time between August 14 and 21 that the State of Massachusetts is threatened with invasion by a hostile naval force—the signal for the beginning of the summer military maneuvers—one of the first acts of Adjutant-General Brigham will be to call out the automobile corps that it is proposed to form. And from then on motor vehicles promise to play a most important part in the defense of the Massachusetts coast. According to the plans for the maneuvers only twenty-four hours' notice will be given of the advance of the enemy, which means that the State militia and the United States soldiers quartered in this State will have to work lively in order to protect the long line of coast from Newburyport to the tip end of Cape Cod and to Buzzards Bay, and it is for this work that the automobiles are to be enlisted.

It is proposed to ask the members of one of the crack military organizations, such as the First Corps of Cadets, to supply forty or fifty cars for the eight days of the maneuvers. If the First Corps can supply all the cars that are needed it may be organized as a motor corps and given special work all through the maneuvers. Otherwise a special motor corps will be organized with an experienced motorist and military man at its head. Besides the forty or fifty cars, the military authorities are planning to secure a number of motor trucks and many motor cycles, the former to carry baggage and supplies between the depot at South Framingham and from camp to camp, and the latter to be ridden by dispatch bearers.

One of the first things to be done after notice of the threatened invasion is received will be the placing of signal stations the whole length of the coast, and it is figured that this can be done with the help of automobiles in a few hours. A touring car with seven or eight men and equipment for field telephone and telegraph lines, flag, light and heliograph signalling apparatus, it is estimated, can establish a whole string of signal stations in a very short time and afterward act as supply car for a whole section of the coast. The cars and motor cycles will also be of value in securing and carrying information.

While it is the intention of the authorities to use the automobiles largely in the signal, medical and quartermaster's departments it is not improbable that experiments will be made in the transportation of troops, somewhat after the manner of the recent experiments in England. For instance, if the main body of troops happens to be quartered at a certain point and an attack is threatened several miles away the automobiles will be used to transport the advance guard to the point in danger and to carry as many others as possible in advance of the main movement. The chief military authorities of the State are enthusiastic over the possibilities of automobiles in the maneuvers, and while their use will depend upon the exigencies of the situation, they are outlining some very important work for the motor corps. Individual automobiles probably will be stationed at the different headquarters and will be used by the commanding officers and the umpires, of which Gen. Leonard Wood, U. S. A., commander of Department of the East, will be chief.

Automobiles have been used before by the Massachusetts militia, for in 1905 the White company supplied several steamers for the camp at Westfield. But in previous maneuvers the automobiles have had to do cross-country work and were at a disadvantage. In the coming maneuvers, however, they will be in their proper element, for all along the coast are excellent roads and cars can make the trip from Newburyport to Cape Cod without leaving the macadam except in a few places. No call for automobiles has yet been issued, but it is anticipated that when it is sent out there will be a very general response from owners who are militiamen. The posts will be responsible ones, for the drivers will have to do much outpost work and will always be in danger of capture by a raiding force landed from some of the enemy's ships.

If the automobiles prove as valuable military auxiliaries as is expected it is not unlikely that steps will be taken for the formation of a permanent automobile corps. Owners of cars will be invited to register their machines at the office of the Adjutant-general, with their size, power and carrying capacity, with the understanding that in case of emergency such as a riot, conflagration or the like, the Adjutant-general may call the cars into service and that the State may use them as long as they are needed, reimbursing the owners afterward. The Chelsea fire, a year ago last April, demonstrated the value of automobiles as an aid to the militia, and it is for similar work that the permanent automobile corps is under consideration. General Wood is said to favor such an organization in every State and the Massachusetts military authorities believe in it thoroughly.

GEN. WOOD SUGGESTS ARMY MOTOR CORPS.

NEW YORK CITY, May 24—Major-Gen. Leonard A. Wood, U. S. A., commanding the department of the East, has interested a number of automobilists in a plan for the organization of an army motor corps. It has been suggested that only runabouts be used inasmuch as they would not be called upon to carry troops, but rather for scouting purposes, carrying besides the owner, a soldier or two trained in quick shooting from a moving auto. General Wood proposes to utilize the corps at the regular army maneuvers to be held from August 14 to 21, having the owners of the cars go into camp the same as do the regular troops, although it would not be necessary for them to enlist. The formation is in charge of Henry F. Caldwell, well and favorably known in automobile circles.

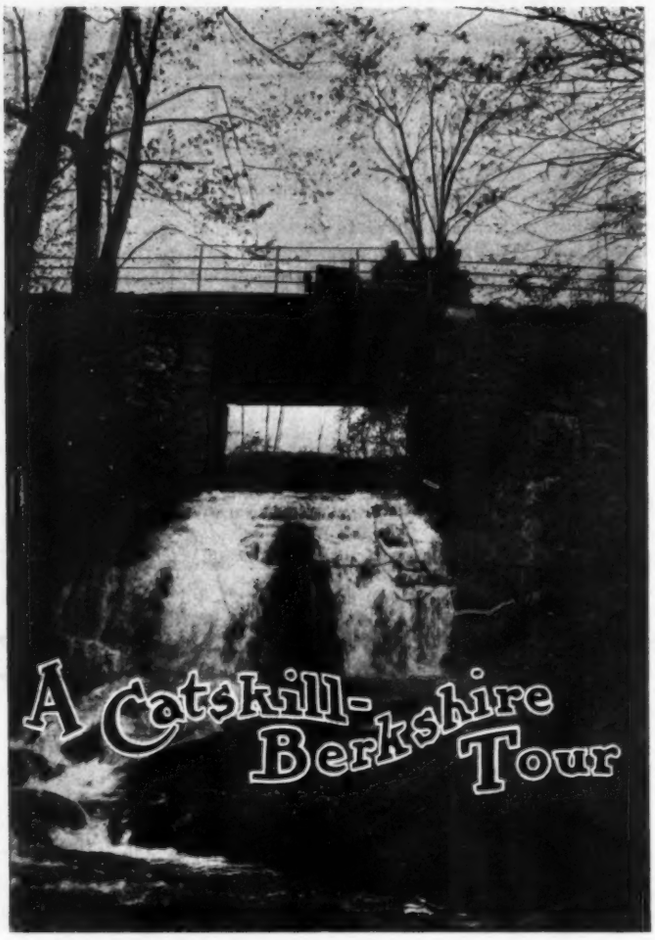
AUTO'S LATEST USE; CHURCH ON WHEELS.

DETROIT, May 24—There is at least one man who does not think the automobile an unmitigated evil, for the Rapid Motor Vehicle Company, of Pontiac, has just shipped to Cincinnati a gospel wagon, equipped with pews, a platform for the speaker and a pipe organ. If anything has been overlooked in fitting up this newest agency for fighting evil it was not discovered. It will be utilized in soul-saving on a trip through the South by "Gipsy" Smith, a well known evangelist.

BANQUET TO REPLACE EUROPE'S BIG RACE.

PARIS, May 22—For lack of an annual road race to unite "Knights of the Steering Wheel," it is proposed that European race drivers should find a common meeting ground around a banqueting table. The idea put forth is that all drivers who have taken part in international road races during the past ten years and have finished among the first ten in any of these events should meet at a race drivers' banquet to be held somewhere in Paris. The idea has met with favor, and the race drivers' banquet will doubtless become an established institution.

Even the French voiturette race, which at one time seemed likely to provide good sport, is now in low water. The regulations have developed a freak type of car with a single-cylinder engine of slightly less than four inches bore and a stroke of ten inches, from which 30 to 35 horsepower can be obtained. Two firms in France, Sizaire-Naudin and Lion-Peugeot, have specialized in this class of diminutive speed monster, with the result that other firms, content to confine their efforts to the production of commercial models, find themselves unable to make even a respectable showing in such company. The consequence is that the voiturette race to be run at Boulogne, on June 20, has only received six engagements, with the possibility of obtaining but three more by the time for closing the lists. The organizers declare that they will hold the race whatever the entries.



This Bridge Separates New York and Connecticut.

PREPARATIONS are going steadily forward for the three-day tour to be held June 12, 13, 14 by the New York Automobile Trade Association. Last week a pathfinding party went over the route in a 30-horsepower White steamer and brought back the report that there is no other three-day trip in the East which can compare in attractiveness with the one selected through the Catskill mountains and the Berkshire Hills. The party, consisting of Chairman Skinner, Photographer Lazarnick, and "Pathfinder" Johnston, besides compiling detailed road directions, made the necessary arrangements with the hotels and garages, and planned the schedule, checking stations, etc., in accordance with the varying road conditions.

The start of the contest will be made from the garage of the Automobile Club of America, in Fifty-fourth street. The cars will then proceed to the West Forty-second street ferry, and, on arriving in Weehawken, "over on the Jersey side," they will check out at one-minute intervals, and will commence to run "on good, old schedule time." The course will follow the Hudson County boulevard for several miles, and then, leaving the shores of the Hudson, will lead into Hackensack by way of the toll road. Arcola is the next town on the route; then comes Waldwick, Allendale, Ramsey, Mahway, with Suffern, the first checking station (28.3 miles from Weehawken). Then will come a ride through the beautiful Ramapo valley, passing through Sloatsburg, Tuxedo, Southfield and Central valley to Highland Mills. Here a detour will be made from the main route to reach the Lake View Hotel, the noon control (48.5 miles from Weehawken). Plenty of time will be allowed for luncheon and arrangements will be made for serving the tourists out of doors, the tables being spread on the shores of the beautiful little lake whose green slopes are surrounded by picturesque hills.

Leaving the noon control, the tourists will continue northward, and on nearing Newburg will once more catch a glimpse of the Hudson. During the rest of the day's trip the route will closely parallel the river, except that, when nearing Kingston, a detour is made inland in order to reach the bridge spanning Rondout creek.

Highland, eighty-two miles from the start, will be the first checking station of the afternoon, and then will come a forty-three-mile run by way of Kingston to the night control, the Hotel Grant, Catskill. The hotel is large enough to accommodate the party without the slightest crowding and an informal dance is scheduled for the evening.

On the second day of the tour, Sunday, June 13, the tourists will have an easy time of it. It has been decided not to start from Catskill until after luncheon, so those in the party will have the morning to themselves. As the contestants will have the use of their cars after checking in at the night controls, some of them will undoubtedly spend the morning in driving to some of the nearby Catskill resorts.

After an early luncheon the tourists will be sent on their way to Albany, thirty-seven miles farther up the river. At Albany the route turns southeasterly and enters the Berkshire Hills. The schedule between Albany and Pittsfield, a distance of thirty-five miles, will be a liberal one, so that all may have an opportunity to enjoy the splendid mountain scenery.

The feature of the afternoon's ride will be the four-mile climb up Lebanon mountain and the long coast down on the other through the quaint Shaker village to Pittsfield. The night control will be at the well-known Hotel Wendell.

The third day of the tour, Monday, June 14, will begin with a trip through one of the most famous resort regions in the world. Leaving Pittsfield, the route leads almost due south, first to Lenox, then to Stockbridge, then through Great Barrington, South Egremont, Salisbury, and Lakeville to Sharon, the first the checking station (46 miles from Pittsfield).

From Sharon the route turns southwesterly through Amenia, Millbrook, and Washington Hollow to Poughkeepsie (77 miles from Pittsfield). After leaving Amenia, the country flattens out considerably, and the run into Poughkeepsie is through comparatively level country.

Poughkeepsie will be the noon control, and the tourists will take luncheon at the Morgan House, in front of which will be the checking station. Located next door to the hotel is "Van's" garage, so that the drivers may readily take on supplies here for the 75-mile run back to New York over the usual touring route. There will be an intermediate checking station at Peekskill (110 miles from Poughkeepsie) and the final checking station of the contest will be in front of the Automobile Club of America clubhouse (150 miles from Pittsfield).

WHAT MASSACHUSETTS LAW MAY BE.

BOSTON, May 24—The Roads and Bridges Committee of the Legislature, which has had before it the uniform automobile bill for more than two months, this week reported the measure to the House of Representatives. It contains the graded-fee provision, cars of less than 20 horsepower to pay $5 a year; from 20 to 30, $10; from 30 to 40, $15; from 40 to 50, $20, and more than 50, $25. A new provision is that a dealer may have five sets of number plates for $25 and must pay $5 for each set in excess of five. The motorcycle fee is $2 and that of commercial vehicles, $5. The maximum speed limit remains at 20 miles an hour, but the limit for thickly settled sections is increased from 12 to 15 miles. The limit at corners, curves, etc., remains at 8 miles. The plan to make the maximum limit 25 miles and driving in excess of that limit conclusive evidence of infraction of the law has been abandoned. A non-resident or his chauffeur may operate in the State ten days without registering.

The bill as reported provides that no person shall allow an automobile to stand in a public way without having the brakes securely and effectively set. If a driver of a horse signals an automobilist must bring his car to a stop and in approaching a street car which has stopped to allow passengers to alight the

car must be slowed down and, if necessary, stopped altogether. Local speed regulations, if made, must have the approval of the highway commission. A deposit of $100 in cash will be accepted instead of a bail bond in cases of arrest for violation of speed regulations. A second conviction of operating while under the influence of liquor is made punishable by imprisonment for not less than one or more than two years. Owners of all public garages are required to keep a record of the movement of all cars so that the same may be at the disposal of the Highway Commission at all times.

SAVANNAH CLUB PLANS FALL RUN.

SAVANNAH, GA., May 24—In connection with the general plan for automobile runs to Atlanta next Fall, previous to the opening there of the national automobile show, the Savannah Automobile Club has decided to arrange an endurance contest to go via Augusta. A cash prize of $1,000 will be given to the winner, half of which will be donated by the club and the other half by the Savannah *News*. It is planned to secure low rates upon automobiles from the North via the steamship lines, so that cars may be sent here and run to Atlanta to the show and return here for the Grand Prize race. The spreading campaign for good roads has been responsible for the action of the enthusiastic autoists of this city.

SOUTHERN CLUB PLANS BIG RACING STUNT.

SAVANNAH, GA., May 24—The Automobile Club of Fitzgerald is deep in the preparations for a big event and its contagious enthusiasm aroused the whole county. At a meeting held last Wednesday, the dates June 15, 16 and 17 were finally decided upon and a committee appointed to look after the advertising and publicity, while other committees to attend to prizes and programs were selected.

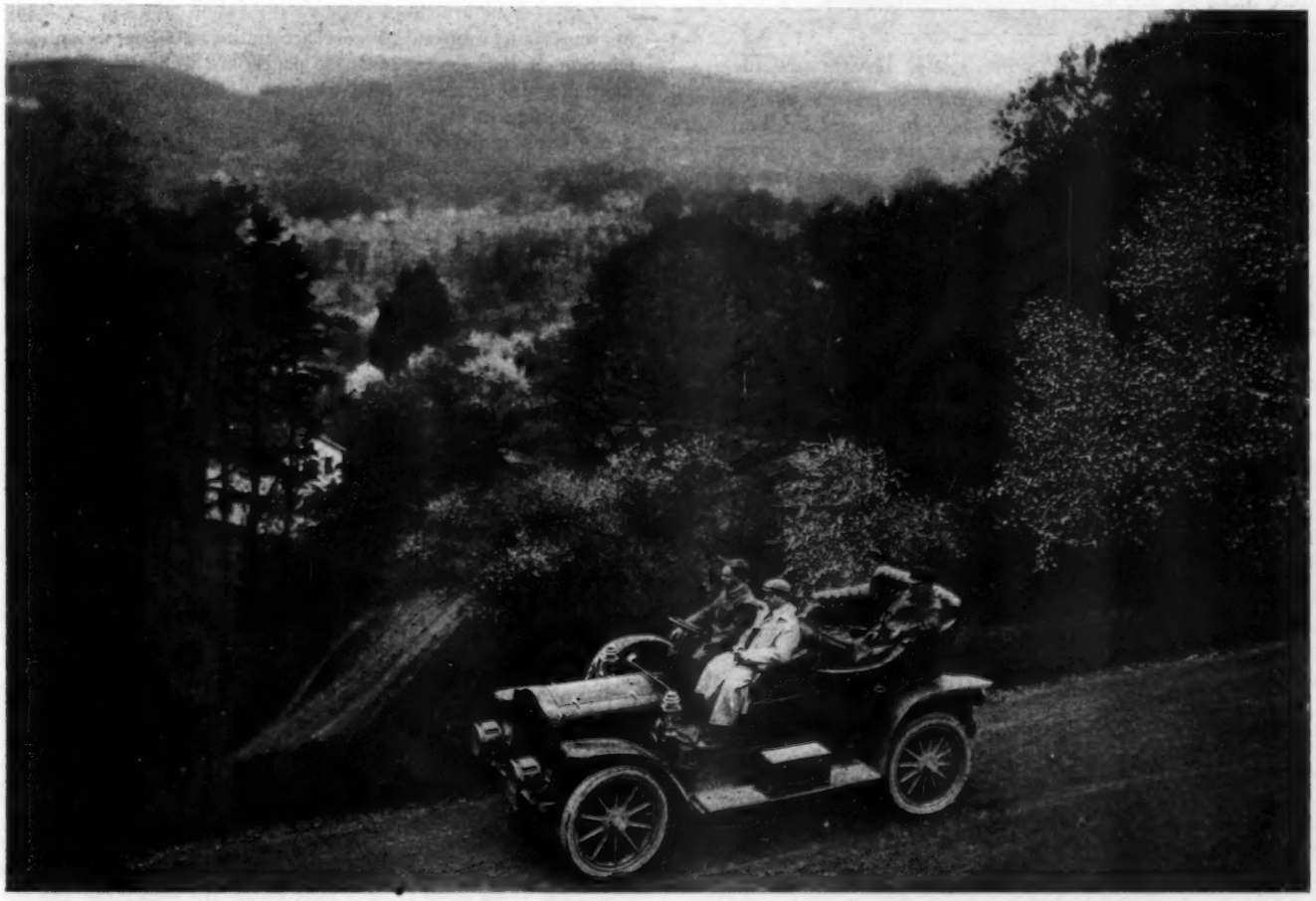
RHEIMS WILL HAVE THE AERONAUTS.

PARIS, May 22—Chateauland, after obtaining and losing the French automobile Grand Prix, has been promised and lost its aeroplane race. As soon as it was known that the automobile race would not be held, an effort was made to put an aeronautical carnival on foot. After a considerable amount of work it has to be recognized that this is an impossibility, for the only date available is so close to the Rheims meeting that the Anjou gathering would certainly end in failure. Thus there will only be one great aeronautical demonstration in France this year, on the vast plains outside the Old World city of Rheims. The races begin Sunday, August 22. The Gordon Bennett aeronautical cup will be competed for on the closing day, Sunday, August 29.

AIRSHIPS RUIN LAWNS: A PROBLEM.

LOS ANGELES, CAL., May 24—Residents of this city who are progressive and yet appreciate beautiful lawns are "under" a problem. How to prevent sand, which is used by airships and balloons as ballast, from marring the grass plots, without seeming to rail at progress in aeronautical science, is being seriously considered. Complaints have been made to the chief of police by owners of residences in the vicinity of the city where the Aero Club is holding its flights. It is said that the lawns are being ruined by the sand thrown by the aeronauts in their flights, and the only way of preventing it seems to be under the city ordinance which prohibits the depositing of refuse or rubbish in any place but cans.

Austria's first aeroplane factory has now been called into existence under the assistance of the Austrian Daimler Company and the Austro-American Rubber Company. The capital at present amounts to 300,000 kroners.



Into the Heart of the Picturesque Catskills, Redolent with the Luxuriant Foliage of Spring.

THE MERCER CAR FROM TRENTON, N. J.

TRENTON, N. J., May 24—Newest in automobile trade circles is the Mercer car which is being built by the Mercer Automobile Company. Occupying the former factory of the Walter Automobile Company, the new concern has been organized by local capitalists, with the business and technical affairs guided by experienced automobile men. In two months a car which seems to embody the essentials for a successful career was designed, extensive tests made over the roads, and already six of the autos have been completed with others being prepared. Constructed along lines which are recognized as standard, the cars have motors of 25-horsepower, with the exception of the taxicabs which are given 18-20; selective sliding gear transmissions; and shaft drive. At present the plans call for the production of three models, the chassis of which will be nearly alike. There will be a touring car; a series of roadsters with several body styles; and the taxicab.

The factory has been taken over entirely and 65 men are at work on the Mercer. The first shop order is for 50 machines, and it is stated that the next will be for 500, for agents have already been secured and orders received. The medium price of the car has been an attractive feature.

In the recent endurance run of the local club, through the Delaware valley, a new Mercer was entered and taken right out of the factory for the trip. It made a perfect score and the motor kept running from early morning until evening. The Mercer Speedster, it is said at the plant, will be the type used in contests, and a racing team for the light car events is under consideration.

Papers for the incorporation of the Mercer Company are ready to file. In all probability Charles G. Roebling will be elected president, and J. L. Kuser, secretary and treasurer. The other incorporators are F. W. Roebling, and Col. A. R. Kuser. R. L. Kingston is the general manager, and the designs for the car were made by Mr. Kingston and E. T. Georges.

DUTY ON AUTOS MAY BE INCREASED.

WASHINGTON, D. C., May 24—Automobiles are again in the public eye, and again the Senate has been amused by the tirades of certain of its dignified members, for the duty on autos may be increased. Over an hour was given to the consideration of the part of the tariff relating to "these engines of destruction," and the committee accepted an amendment increasing the customs duty to 50 per cent. on automobiles and automobile parts, leaving the present rate of 45 per cent. on motorcycles, bicycles, and their parts. Senator Heyburn was the principal speaker against the machines, supported by Mr. Hale and Mr. Bailey. Mr. Heyburn, who is from Idaho, a State which recently made large appropriations for building good roads for the ocean to ocean automobile contest, said: "I should like to see a tax of 100 per cent. on these machines, and I am amazed that the courts should have decided that they have the same rights as other vehicles on our country roads. People must flee to places of safety while these engines of destruction pass along the roads. Laugh? Why the rich shout with glee while the farmer flies through the air to be distributed over nearby fences."

ORPHANS' DAY WIDELY REMEMBERED.

Although June 9 has been set by the A. A. A. as the national orphans' day, when clubs, trade associations, or other automobile bodies, would give an outing to the little folks in city charitable homes, a number of cities have found it convenient to select some other dates. A few of those chosen are mentioned here, with the name of the place, and of the body in charge. They are:

New York City, June 9, W. J. Morgan's Voluntary Committee.
Philadelphia, June 9, Quaker City Motor Club.
Brooklyn, N. Y., June 8, Long Island Automobile Club.
Pittsburgh, Pa., June 3, Automobile Club of Pittsburgh.
Cincinnati, O., June 3, Cincinnati Dealers' Association.
Columbus, O., June 19, Columbus Automobile Club.

NEW BOOKS FOR AUTOMOBILISTS.

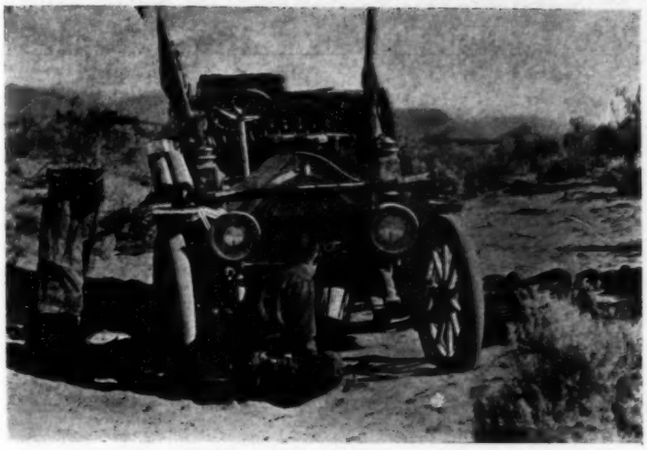
An Old Friend with a New Name—The fourth edition of the French trade directory "L'Annual 1909," previously known as Baudry de Saunier's Annual, is larger and more complete than its predecessors. Within the stout cloth cover are more than one thousand pages of closely printed matter arranged in alphabetical order for convenient reference. The Annual really comprises two distinct works, the first portion being a list of all firms, persons, clubs, associations, newspapers, etc., in any way connected with the automobile industry. Every French firm and most of the foreign ones have their place in the alphabetical list, the information concerning them being complete and accurate. The second section is a technical dictionary, in which all technical terms are explained by text and drawings in a manner that has not been attempted in any other publication. Persons having any connection with the French automobile industry, or having to deal with French technical terms, will certainly find this work a valuable one to have constantly at hand. The publisher is M. Hubert Baudry, 58 Rue de Monceau, Paris.

Factory Organization and Costs—The recent great interest manifested in these subjects has resulted in the production of this very extensive work on the subject from the able pen of J. Lee Nicholson. Mr. Nicholson is a certified public accountant of New York city, with a large and varied experience in this class of work, consequently he knows whereof he speaks. Although intended primarily as a handbook for manufacturers, it is so arranged and written that it may also be used as a book of reference by the cost accountant, and a textbook for the student. Its 404 large pages are divided into two general parts; first, the subject matter as indicated by the title, under some 39 chapter headings, and, second, mechanical office appliances. The latter is extensively treated in nine chapters, the various machines now on the market being described in detail.

Wage systems are dwelt upon to the extent of 18 pages, while the important subjects of cost accounting, 10 pages, and distribution of indirect expenses, 20 pages, are well and thoroughly covered in the space devoted to them. Distribution, in particular, is worked up in a very comprehensive manner. The balance of the book is devoted to typical forms and their explanation. The work is published by the Kohl Technical Publishing Company, New York City, and as sent out is handsomely bound in three-quarter black morocco.

"Artificial and Natural Flight"—In this small work from the pen of Sir Hiram S. Maxim, one of the first to appear on the subject, there are eight chapters, six of which are devoted closely to the subject, *per se*. Of these chapter four, treating of Screws, touches very briefly upon the screws in use, but confines himself mostly to theory upon which they act. Farman's screws are described and illustrated. The following, or fifth, chapter is an excellent one, treating, as it does, of various experimental work with rotating arms in general, and Professor Langley's in particular.

Amateurs interested in building a machine will refer to the sixth chapter dealing with Building of Flying Machines, in which is to be found a first-rate table of woods; their strengths, weights and comparative efficiencies for aerial use. The closing part of the text matter is a chapter on various subjects, in the last part of which, headed Some Recent Machines, an unwarranted and cowardly attack is made upon the Yankee champions, the Wright Brothers. The sting of the statements is but partly removed by the insertion in the book of a final statement that "recent events show that the Wright Brothers are able to outdo anything that was reported in the American press, etc.," and "the remarkable success of the Wright Brothers has placed the true flying machine in a new category." The book is from the press of the Macmillan Company, 66 Fifth avenue, New York City. The press work is of a high order, the type good and the paper excellent.



Chalmers-Detroit Stranded in Mid Desert.

THE "FLAG-TO-FLAG" DESERT STORY.

Automobilists all over the country read with interest the reports of the experiences of the "Flag-to-Flag" pathfinding party, which was stranded recently in a Mexican desert. The detailed story of the adventures has just been received, as told by W. E. McCarton in the El Paso *Times*. Four men, Mr. McCarton; William Knipper, the driver; F. Ed. Spooner, the photographer; and James Howard, the guide, in a Chalmers-Detroit "30" constituted the outfit, en route from Denver to Mexico City. When the stop came, they were 46 miles from the nearest railroad and 60 miles from El Paso. Mr. McCarton says:

"We left Jaurez on Friday morning, passed Gaudeloupe, and were about to turn around Candaleria Pass shortly after 2 o'clock, when we stuck fast in the deep sand. Our trip all day had been a battle with a terrible sand storm, which drifted like snow, and we seemed to be in an ocean of sand. This district is the worst desert on the North American continent, but notwithstanding the difficulties we made good time until we struck a hidden lake on the mesa, and then we plunged into a depression and were up to the hubs in soft sand. Poles and tackle were of no avail and we started to make the best of conditions. Our water had about given out and all that we had left was some prepared bean soup. We could not get a fire started and when we tried to pitch our tent that was also a failure, because we couldn't drive a stake that would stay. Howard volunteered to go for help, and started out over the pass to look for a ranch house. He was gone over two hours when Spooner and I started out in the same direction, and we met him coming back.

"By 6 o'clock we were getting desperate and Howard and I started west to strike the Mexican Central tracks, while Spooner started back to wait with Knipper. We walked all night over mesa, guided by the north star, and by daylight were completely fagged out, without having seen a sign of habitation. I was all in and by 6.30 could go no further. Howard went on alone and a good many miles further found some water and brought it back to me. We reached the railroad about 2 o'clock that afternoon and caught a train into El Paso. As soon as we recovered and rested a relief party was organized, and went out with food and water for Spooner and Knipper, who had nothing to eat and only the water in the radiator to drink."

JERSEY TRADESMEN HONOR WORKERS.

NEWARK, N. J., May 24—Eulogized as having been mainly responsible for the better automobile legislation now enjoyed in this State, President W. C. Crosby and Joseph H. Wood, of the New Jersey Automobile and Motor Club, were recently presented loving cups by the New Jersey Automobile Trade Association at a dinner given in their honor. In addressing the two guests President George Paddock ascribed to them the services which did most to obtain the new statutes, and expressed for the entire automobile fraternity the gratitude due to them.

NEW PENNSYLVANIA LAW IN FORCE!!!

PITTSBURG, PA., May 24—Just which way an automobilist is to turn in the State of Pennsylvania has been a quandary for several weeks, but Attorney-General Todd has advised the Automobile Club of Pittsburg that the new law is now in effect. This means that tourists from other States, at least those granting reciprocal courtesy to Pennsylvanians, may use Pennsylvania highways for a period of 10 days without taking out a license. The maximum speed is 24 miles per hour. There has been considerable misunderstanding about this matter, and the authorities have given out conflicting statements; but it is believed that the opinion of the State's legal adviser will settle the question.

E. P. CHALFANT TO BECOME A PACKARDITE.

E. P. Chalfant is to transfer his base of operations from New York City to Detroit, whither he will go in about a fortnight to become one of the big cogwheels in the well-planned machinery of the Packard Motor Car Company. Mr. Chalfant's resignation as general manager of the Association of Licensed Automobile Manufacturers will receive attention at the June 2 meeting of the executive committee of that organization. No successor has yet been mentioned, but it is well understood that Mr. Chalfant's occupancy of the place has been very satisfactory to the members.

1910 WHITE STEAMERS WILL USE KEROSENE.

CLEVELAND, May 25—Official announcement has been made by The White Company to the effect that kerosene may be used as fuel on all 1910 models. This is made possible by the fitting of a special kerosene burner, the result of ten years' work on the part of the company. This new burner may be adjusted so as to burn gasoline also, if preferred to the cheaper fuel. The use of kerosene as a fuel will relieve the fast growing scarcity of good gasoline and thus aid to clear up the fuel situation.

PHILADELPHIA HOUSE ADOPTS AUTOMOBILES.

PHILADELPHIA, May 25—Recently the large and old-established firm of Strawbridge & Clothier began a strenuous and protracted test of an Autocar delivery wagon. This test has now been concluded by the purchase of several with bodies of the type shown in the illustration. These are in use for suburban deliveries, which they are enabled to make, not only more expeditiously, but more cheaply as well. Since started on regular service, the cars have not missed a day, nor a trip, and have displaced two two-horse wagons and six with a single horse. In the picture, one of the new self-propelled cars is shown starting out in the morning on its first trip to the suburb with its load of carpets and other things for the suburbanites, whom the management say the cars bring into closer touch with the store.

Autocar Delivery Wagon for Philadelphia Merchants.

BOSTON HAD FIRST Y.M.C.A. SCHOOL.

BOSTON, May 24—The Boston Y. M. C. A. in 1903 established the first automobile school in America. Prior to this time there had been instructions given to a selected few by the garages and factories. Since then the school has continued to prosper and grow in equipment and attendance until now it is acknowledged as one of the foremost schools of automobile construction in the country. It includes not only a high grade of young men who are entering the automobile business as a profession, but also prominent professional and business men who take the course to gain a thorough knowledge of automobiles, not perhaps to drive their own car, but to know whether they are getting maximum results and whether their chauffeur knows his business.

To meet a demand the Boston Y. M. C. A. has established a department devoted entirely to supplying first class automobile help of all kinds to dealers, garages and private owners throughout New England. These men are experienced in driving different cars and in repair work, and have satisfactory recommendations from former employers, but it is only after the investigation of the department that they are pronounced to be of ability and character. The best men, and the ones that are recommended the highest, are graduates of the school who have gone out and received the training of from one to five years' actual road or shop experience.

Another advantage of the department is the elimination of undesirable applicants who are not qualified for the position on account of inexperience or other cause. This is obtained by requiring a statement from the employer as to the requirements of the situation. From this information a man is selected from the list who will fill these requirements.

The department receives the support and recommendation of the largest dealers in Boston, and also their assistance by furnishing experienced chauffeurs whom they can recommend as reliable operators for their particular cars. The department also supplies competent men for the position of helper, or second chauffeur, who are capable of driving and caring for cars under the supervision of an experienced man. This should appeal to automobile owners and dealers in New England, as they are certain of obtaining reliable and competent help without trouble or expense.

BOSTON HOME FOR PACKARD AND CADILLAC.

BOSTON, May 22—Ground was broken in this city to-day for a structure which, when completed next fall, it is believed will be the largest and most complete automobile establishment owned by any dealer in the United States. This is to be the service depot of Alvan T. Fuller, local agent for the Packard and Cadillac, and it will cost, including the land, approximately $200,000. The new building is to be four stories high with a basement and the ground plan will be 70 x 340 feet. The structure will be of reinforced concrete, fireproof throughout. The land, purchased by Mr. Fuller a couple of months ago, is on Commonwealth avenue, corner of Malvern street. It is a conspicuous location and the building will be a prominent landmark on the main thoroughfare leading into and out of Boston from the Western suburbs.

Mr. Fuller will not give up his salesrooms in the Motor Mart in Park square, but will place in the new building a most complete equipment for every kind of work that may be required on the cars he represents. He has long made a specialty of overhauling Packards and Cadillacs and to this work the larger part of the depot will be devoted.

Baltimore, Md.—The new salesroom and garage of the Baltimore-Stoddard-Dayton Motor Car Company, on West Royal avenue, is nearing completion. It will be used exclusively by this company, which handles the Stoddard-Dayton and Renault cars. Leo Schaab is the manager.

DIAMOND TIRES NOT IN AKRON FIRE.

AKRON, O., May 24—It has developed that the Diamond Rubber Company did not lose any tires in the recent fire in this city. The first reports stated that this concern had a large amount of product stored there for shipment, but this was incorrect. The Diamond company had $150,000 worth of fabric in the building, but it was removed a month before the fire.

R. M. OWEN PLACES LARGE CONTRACT.

NEW YORK CITY, May 24—R. M. Owen & Company have placed with the Reo Motor Car Company what is said to be the largest order for automobiles ever contracted for in the history of the industry. The deal involves the marketing of $50,000,000 worth of Reo automobiles by the Owen company. Since the organization of the Reo company, the New York house has sold the product and the plan will be continued.

SEVERE TEST FOR 1910 MITCHELL.

RACINE, WIS., May 24—California has been selected as the testing ground for the 1910 Mitchell car, which has been completed by the Mitchell Motor Car Company. J. W. Bate, the designer of all the Mitchell cars, will ship the new machine to the Pacific coast, and accompanied by General Manager William Mitchell Lewis, will give the car a thorough trying out in the mountains and over desert roads, a varied road condition impossible to be found in the flat country at Racine.

RAPID TRUCK SAVES A TOWN.

CAMPTOWN, PA., May 24—This town owes its existence at present to a rapid freight and passenger truck owned by the Auto Transit Company, which pulled a fire engine from Wyalusing recently to fight a fire that was destroying the town. A most disastrous fire started in a country store and when the alarm was given chauffeur Stone of the Rapid truck started on a record run to the neighboring town for the fire apparatus. Pulling the hook and ladder and carrying twenty-three Wyalusing fire fighters it returned in time to save several buildings which were in imminent danger.

STUDEBAKERS SECURE IMPORTANT CONTRACT.

NEW YORK, May 24—Great significance is attached by those interested in the development and more general use of commercial vehicles to the contract recently executed between the H. C. Piercy Company, of this city, and the Studebaker Brothers Company. By this the former will purchase from the latter an equipment of automobiles which will transform its immense delivery service from a horse-drawn to a mechanically propelled one, and its effect may be realized from the fact that this move will replace the horse delivery service of at least 66 prominent business firms of the city. The Piercy Company's business was started in 1870, and its horses, wagons and men have been organized to a high point of efficiency, directed from a central station, with a substation in Brooklyn. Almost a year has been consumed by the management of the concern in arranging with the engineering department of the Studebaker Company the details of the proposed change, until now it is felt that not the least friction will be noticed in making such a radical alteration and extensive improvement.

The present headquarters are located on West Fifteenth street, consisting of a six-story building containing 90,000 square feet of floor space, sufficient to house 500 automobiles, and with two elevators capable of raising the heaviest ones. The equipment and stable fittings were installed recently with a view to dispensing with them if necessary to make the building a garage. The Brooklyn station will accommodate 50 machines, and it is projected to locate substations in the Bronx and in New Jersey, so that heavy loads may be taken to these points.

NIGHT WORK NEEDED AT SPLITDORF FACTORY.

PRODUCING two hundred magnetos every day, over one thousand spark plugs, and about two hundred coils, the factory of C. F. Splitdorf, in upper New York City, is now in the midst of one of the busiest seasons of its history. Working day and night, closing only on Sundays, it has become the effort of the managament to so arrange manufacturing operations as to fill as much as possible the orders which are received from automoboile factories and retailers all over the country. Having been established in 1858, the Splitdorf laboratory is one of the oldest in the business of making electrical ignition apparatus, and in its comparatively new structure, with its large output, is one of the largest. Six floors and a basement are utilized, and it has been found necessary to make additions on the vacant ground adjoining in order to produce sufficient material to meet the demand. The area of the structure is large in itself, so that there is room for about 600 employees, with the various departments located to economize in space.

Over 150 machine tools are in operation throughout the building; lathes, drill presses and special machines being run at a maximum compatible with producing goods of quality. Everything that goes into the makeup of the apparatus is manufactured by the Splitdorf company; the iron for the magnets is treated, formed and magnetized; the armatures are wound; the magneto parts are machined from the castings; gears are cut; coils entirely formed and packed; and, in fact, every process can be seen from the receipt of the supplying materials to the shipping of the finished products.

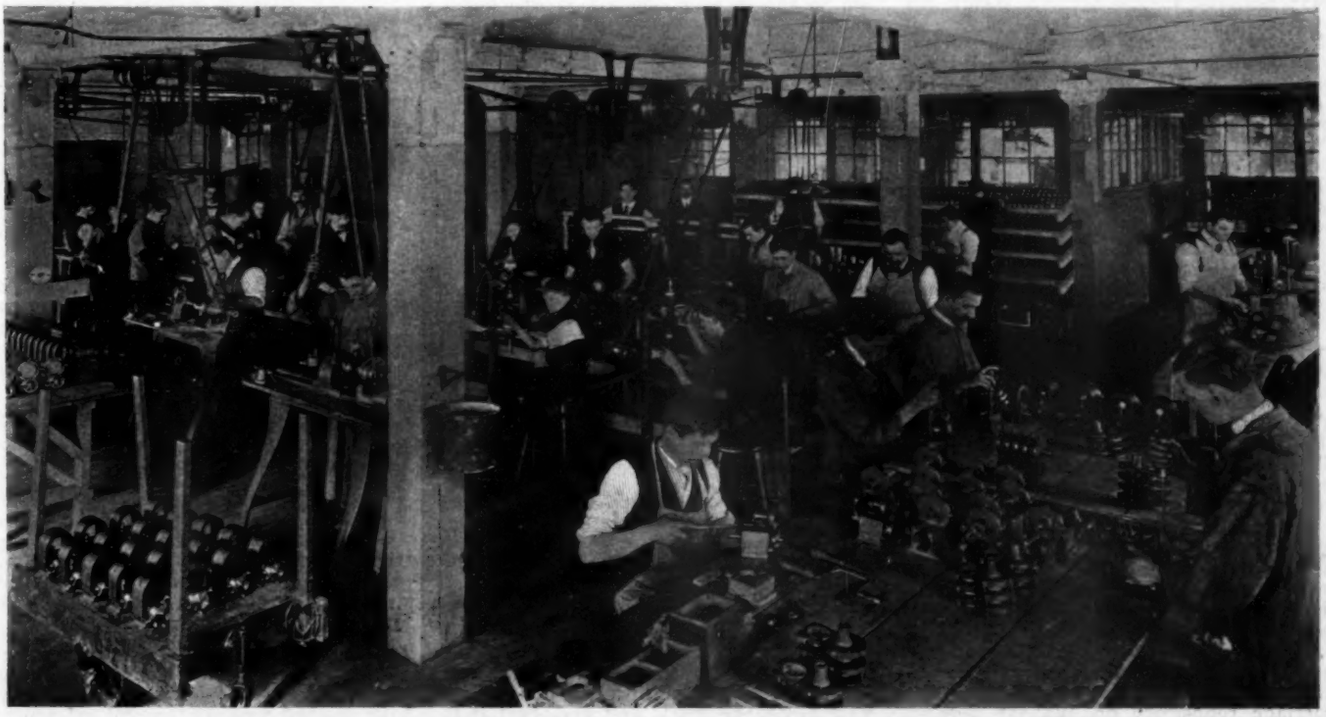
On the top floor of the big plant the spark plugs are manufactured, and in their construction are seen some Splitdorf features, such as the winding of mica insulation laterally on the spindle, the claim being that this method is superior to the use of mica disks because it prevents the oil from penetrating to the spindle and short-circuiting. Porcelain is used only as a protector between the top of the metallic bushings and the binding post. A small compression space is designed for the purpose of causing any oil which may get into it to be blown out by the force of the explosion. Of the thousand plugs made, some are of the standard Splitdorf in half-inch, metric, Winton, and A.L.A.M. sizes, and some are low-tension plugs.

The fifth floor is used partly for constructing the coils, several types being made, those for one, two, three, four, and six cylinders, with or without the Splitdorf system of synchronizing and to be used with or without magneto, or for both batteries and magneto. It is stated that about 120 coils for two-cylinder cars are made each day; about ten for four-cylinder cars; about twenty-five for use on marine engines; about ten for the synchronized system, and the remainder for various service. The boxes are all made of mahogany, with the exception of a few made of quartered and polished oak. There are many different styles, for the makers of automobiles want the boxes to fit each individual make of car dash, and for this purpose special sizes and designs have to be followed.

Coil Assembling Room in the Splitdorf Factory.

Two entire floors are given over to the mechanical work in connection with the magneto systems, magnetizing the horseshoe-shaped bars of iron, machining the parts, in assembling the finished sections and in testing the sets. The Splitdorf arrangement gives a unit consisting of the magneto proper and a transformer, the office of the latter being to step-up the voltage from 45 to 31,000. One complete set is made every five minutes.

Splitdorf products consist mainly of six models of magnetos; nearly a dozen types of coils; timers of several kinds; spark plugs, cut-out switches and commutators. The factory office of the concern is in New York City, and branches are maintained in that city, Boston, Detroit, Chicago and San Francisco.



Where Splitdorf Magnetos Are Put Together With Painstaking Care That Every Part Is Right.

The Rambler Doing Duty as a Mountain Climber.

From time immemorial there has been keen rivalry over the honor of climbing McFarland Butte, one of the peaks of Mt. David, near cottage Grove, Oregon. Recently J. B. Van Winkle, of Eugene, Ore., stole a march on his rivals, when he made the ascent with a 34-horsepower Rambler, carrying two passengers besides the driver.

Records Kept of Pierce-Arrow Students—Although the school of instruction at the plant of the Pierce-Arrow Motor Car Company at Buffalo will be continued for some time, a sufficient number of persons have already taken the course to give a good idea of where the chauffeurs come from. An accurate record is easy to keep, since each man is required to give upon a card a notation of his previous experience, both along driving and mechanical lines, as well as his former occupations. The course covers two weeks and then a report upon the capabilities of each student is made. The reports so far show that only 47.3 per cent. of the men have had previous driving experience, and of these a comparatively large proportion have handled Pierce-Arrows, taking the course to refresh their knowledge. Of those who had no driving experience, many had been in lines which did not aid them in the automobiles, 13.8 per cent. having been coachmen who remained with their employers when a change from horses was made. About 14 per cent. were repair men and mechanics. Some of the reports are very interesting, as for instance: "An old coachman. Very willing and anxious to learn, but too old to master mechanical details. However, handles car well and carefully and with practice will develop into a good driver." Another reads: "Bright Irishman, formerly a coachman. Learned rapidly and handles car well. Will develop into very good man."

New Chicago Home for Studebaker—The Studebaker Company is erecting at the corner of Michigan avenue and Twenty-first street what will probably be one of the most elaborate and finely equipped automobile salesrooms and garages in this country. The building will be of solid concrete, seven stories in height, with a frontage on Michigan avenue of 75 feet and 175 feet on Twenty-first street. It is expected that it will be ready for occupancy about January 1, 1910, and as soon as completed the automobile department of the Studebaker Company, now located with the carriage repository on Wabash avenue, will take possession of the entire building. With three factories—the Studebaker-Garford, at Elyria, building 1,500 cars every year; the Studebaker E-M-F plant in Detroit, turning out 1,000 medium-priced cars every month, and the South Bend factory, making over 1,000 electric pleasure and commercial cars a year—the Studebaker will make the same bid for position in the automobile field as it has in the carriage business.

Prizes for Pictures of Rambler Autos—Thomas B. Jeffery & Company, Kenosha, Wis., the manufacturer of Rambler automobiles, has just awarded $100 in cash for photographs illustrating the pleasure and utility of owning a Rambler car. The offer was made some time ago through the house organ, the **Rambler** magazine, and as there are 15,000 owners of Rambler cars in this country, according to the factory officials, it was but a short time until several hundred photographs were received. The prize winners are as follows: Rambler Garage & Supply Company, Norfolk, Va.; W. K. Cowan, Los Angeles, Cal.; P. W. Lochmiller, Albion, Neb.; H. W. Brown, Tifton, Ga.; J. H. Linsley, New Haven, Conn.; H. W. Davidson, Marietta, O.; C. M. Willis, Auburn, Cal.; M. H. McCarthy, Somerville, Mass.; Arthur Cummings, Winthrop, Mass., and John S. Butzer, Ephrata, Pa.

Waverley Makes Hard Cross-Country Run—In delivering a Waverley electric auto recently the E. Keeler Company, of Williamsport, Pa., was required to give the machine an unusually critical test. It was to be taken to Milton, 31 miles away, and in that distance the roads were none too good and there were seven hills to be climbed, some known to have inclines as steep as 20 per cent. Manager A. A. Maitland directed the test, the car being driven by Harry Knoll, and accompanied by Elmer Shrimer, the purchaser. The distance was covered in two hours and twenty-five minutes' running time, without any trouble or endeavor to make a fast trip.

Oldfield Will Use National "Six"—Barney Oldfield has announced that this year he will outline an active campaign for racing on straight-away courses as well as on the track, and says that it is his intention to drive his own car without any connection with the makers. He has recently ordered a six-cylinder National and is in Indianapolis at present superintending its construction. It will be a stock model, except that the chassis will be somewhat lighter than the one used at Savannah and in the New York Carnival races and hill climb.

Manufacturers of Lubricants Meet—The committee of manufacturers of lubricants of the Motor and Accessory Manufacturers' Association met recently and formally organized. George Baum, of Adam Cook's Sons, was elected chairman and W. M. Sweet, of the association, temporary secretary. The members present were: William B. Shedden, the Columbia Lubricants Company, of New York; L. H. Snyder, the Jos. Dixon Crucible Company, and George Baum, Adam Cook's Sons.

Turner Brass Works Secures Injunction—The Turner Brass Works of Sycamore, Ill., manufacturers of mechanical appliances, automobile specialties, etc., has secured a permanent injunction restraining the Appliance Manufacturing Company, of Chicago, from manufacturing or selling the Amco bumper. The Turner Brass Works is the licensee of the Harroun bumper patent, No. 873,544, upon which its litigation was maintained.

Swinehart Tire Company Will Not Move—It was reported recently that the Swinehart Clincher Tire & Rubber Company, of Akron, O., was about to consolidate with the Mansfield Rubber Company and would move to Mansfield, O. B. C. Swinehart, vice-president of the Swinehart Company, announces that this report is incorrect and that his concern has no idea of either consolidating with any company or of leaving Akron.

New Concern to Make Supplementary Springs—M. H. Cormack, of New York City, has organized and incorporated the firm of H. H. Cormack & Company, of which he is president. The concern will manufacture a line of supplementary spiral springs, together with several other lines of automobile accessories.

Auto Factory for Oklahoma City—J. B. Worthington & Company has purchased machinery to be used in an automobile factory in Oklahoma City, Okla. It has already been shipped to the Southwest and as soon as it can be installed will turn out completed cars.

Bosch Magneto on Flag to Flag Car—The Bosch Magneto Company is calling attention to the fact that the Chalmers-Detroit car which is blazing the way for an endurance run from Denver to Mexico City is equipped with a Bosch magneto.

IN AND ABOUT THE AGENCIES.

Haynes, Philadelphia—The Haynes Automobile Company, of Pennsylvania, which will handle the Haynes output in Philadelphia and adjacent territory, has opened handsome salesrooms at 211-213 North Broad street. James H. Johnson & Sons will manage the new concern.

Herreshoff, Philadelphia—To round out its line, which at present consists of the American, Midland and Babcock electric cars, the Stoyle-Vogel Company, at the southeast corner of Broad and Race streets, has just secured the local agency for the Herreshoff car.

Reo, Savannah, Ga.—Charles P. Henderson & Company, general Southern agents for the Reo Motor Car Company, have opened new offices and salesrooms at 119 State West, to be occupied until their new building is completed.

RECENT BUSINESS CHANGES.

Pittsburg Truck Company Will Move—Having secured a factory at Ithaca, N. Y., the Pittsburgh Motor Truck Company will move from the Smoky City to the town of Koppel, N. Y., and take its Ithaca plant to that place. The concern has been recently chartered with a capital of $100,000 and will engage in the manufacture of automobile trucks.

Slack Mfg. Company, Springfield, Vt.—W. W. Slack, president, Gilman & Son, Inc.; H. K. Parkman, secretary, Gilman & Son, Inc., Springfield, Vt., and G. C. Parker, sales manager, Wm. J. Smith Company, New Haven, Conn., have formed a partnership for the purpose of manufacturing and selling Abrasive Metal Cutters, under the name of Slack Manufacturing Company, Springfield, Vt., all parties to retain their present positions with their respective companies.

John Kane Mills has announced his withdrawal from the firm of Mills & Moore, of New York City, the managers of the New York to Seattle endurance and other contests, and familiarly known to the trade as "accelerators of sentiment." Private business matters requiring his undivided attention at present are responsible for the move, according to Mr. Mills.

A. E. Schaaf will be the general manager of the American Fiat factory, which will be located at Poughkeepsie, N. Y. Mr. Schaaf was formerly general manager of the Pope Motor Car Company, of Toledo, and with Mrs. Schaaf is now taking a tour from Paris to Turin, the home of the Fiat, with Nazarro at the wheel.

J. Howard Morse and Mrs. Morse, of Hartford, Conn., have sailed for Europe to spend the next three or four years in touring upon the Continent. They will make their home in Switzerland. Mr. Morse was formerly president of the Automobile Club of Hartford.

Alfred Reeves, general manager of the A. M. C. M. A., has just returned from a trip to the various automobile factories in Pennsylvania and states that from the indications the Keystone State is now taking a lead in the automobile industry.

Hiram Percy Maxim, designer of the Maxim-Goodridge electric automobile and the Maxim tire inflater, has sailed for Europe to demonstrate his gun silencer. He will go to London, Liege, Paris, Berlin and Vienna.

F. A. Barker has accepted a position with the Overland Automobile Company of Indianapolis, Ind. He was formerly publicity manager of the Dayton Motor Car Company, of Dayton, O.

J. E. Finney has joined the sales forces of the Savannah, Ga., agent for the Reo automobiles. He was formerly connected with the Buick agency.

Wilbur C. Walker, secretary of the Pope Manufacturing Company, has returned to the factory from a business trip to the Pacific Coast.

NEW AGENCIES ESTABLISHED

Maxwell: Pasadena, Cal.—Maxwell Automobile Company, F. J. Purdy, sales manager, 161 West Colorado street.

Durocar: San Francisco, Cal.—W. A. Breen and J. A. Houlihan, Golden Gate avenue and Polk street.

Rider-Lewis: Minneapolis, Minn.—Segerstrom Automobile Company.

Rider-Lewis: Macon, Ga.—Napier Auto & Supply Company.

Gaeth: Milwaukee, Wis.—Auburn Motor Garage Company.

Rider-Lewis: Dallas, Tex.—White Sales & Garage Company.

Regal: Springfield, O.—E. D. Valentine, King Garage.

Rambler: Springfield, Ill.—Springfield Garage Company.

Gaeth: Chicago.—International Automobile Company.

Auburn: Orange, N. J.—J. J. Mayer, for the State.

Rider-Lewis: Iowa—J. A. Wicke, Marengo, Iowa.

Frontenac: Baltimore, Md.—Meredith Dryden.

E-M-F: Arcadia, Fla.—Major W. G. Welles.

Frontenac: Passaic, N. J.—E. J. Beuret.

Brush: Bloomsbury, N. J.—James T. Smith.

Ford: Opelika, Ala.—G. R. Spencer.

RECENT INCORPORATIONS.

Livingston Radiator & Manufacturing Company, New York.—Capital $100,000. To manufacture cooling and heating radiators, automobile engines, cars, wagons, boats, aeroplanes, etc. Incorporators: J. N. Boyle, A. S. Rockwood, Thomas Roberts, 30 Broad street.

Belmont Automobile Manufacturing Company, New Rochelle, N. Y.—Capital $100,000. To manufacture, rent, and sell automobiles. Incorporators: Douglass Hamilton, H. A. Meiser, H. A. Lucker.

Fred J. Titus Company, Newark, N. J.—Capital $100,000. To manufacture and deal in automobiles, aeroplanes, airships, etc. Incorporators: Fred J. Titus, John N. Hance, Grace D. Hance.

Pittsburgh Motor Truck Company, Wilmington, Del.—Capital $100,000. Incorporators: P. C. Benedict, Salamanca, N. Y.; C. C. Conkle, Pittsburgh, Pa.; M. E. Smith, Wilmington, Del.

Belmont Automobile Company, New Rochelle, N. Y.—Capital $100,000. To manufacture, rent and sell automobiles. Incorporators: H. A. Meiser, H. A. Lucker, Douglass Hamilton.

Taxi Garage Company, Augusta, Me.—Capital $200,000. To carry on a general cab and truck business by motor or other power. President, R. S. Buzzell; treasurer, S. W. Pike.

Times Auto Supply Company, New York.—Capital $20,000. To manufacture automobiles, motors, motor boats, etc. Incorporators: C. O. Jones, B. H. Ellis, H. T. Johnson.

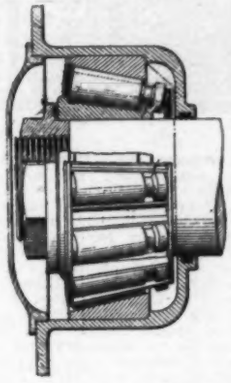
The Governor's Trophy.

This is the handsome cup put up by the Keystone State's chief executive for the Harisburg run, and won by a 28-horsepower Franklin machine, Carris driving.

SOME SELECTED AUTO PATENTS

Issue of May 18.

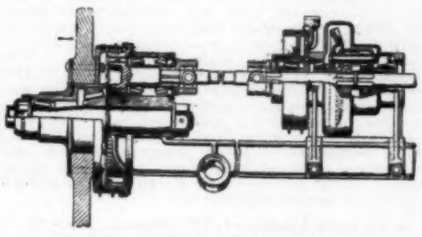
921,656. Roller Bearing. Herbert W. Alden, Canton, Ohio. Filed April 15, 1907.



Alden Roller Bearing.

The feature of this invention of the well-known Timken engineer is the pressed steel cage which retains the rollers in place. While pressed steel cages have been used by the Timken people for some time, this one is constructed in a decidedly different manner. The rollers are retained by flanges and not by holes.

922,372. Propelling Mechanism for Motor-Driven Vehicles. Alexander Winton and Harold B. Anderson, Cleveland, Ohio. Filed Oct. 30, 1906.



Winton Rear Axle Construction.

As the apparent handwriting on the wall, this looks like a new idea in Winton rear axles, along the same lines as that used in the De Luxe. The rear bevel and differential housing are carried above the rear axle proper, which has an I-section. From the driving shaft to the rear wheels, the drive is not direct but is by means of spur gears, housed within the rear hubs and brake drums combined.

921,679. Controlling the Exhaust from Internal-Combustion Engines. Thomas B. Doolittle, Branford, Conn. Filed Aug. 27, 1908.

921,705. Timing Gear Mechanism for Explosive Engines. Lindley D. Hubbell, Hartford, Conn. Filed April 27, 1908.

921,710. Pneumatic Tire. Grant Jacobs, Des Moines, Iowa. Filed March 13, 1908.

921,754. Transmission-Gearing. John M. Van Dyke and Fayette R. Rowell, Canastota, N. Y. Filed Sept. 8, 1908.

921,769. Starting Device for Gasoline-Engines. John L. White and Joseph B. Polo, Clear Lake, S. D. Filed Feb. 8, 1908.

921,802. Rotary Explosive-Engine. Schuyler H. Conkey, Minneapolis, Minn. Filed July 30, 1908.

921,862. Vehicle-Spring. Edmon F. Mayhew, Mooresville, N. C. Filed Nov. 11, 1908.

921,864. Valve-Motion for Gas-Motors. Gustav Mees, Dusseldorf, Germany. Filed Oct. 21, 1903.

Some Recent Trade Publications

Herz & Company, New York—Ignition specialties for automobile, marine, and railroad gasoline engines, manufactured by Herz & Co., New York and Vienna, are listed in the new catalogue of this concern, entitling it an edition for 1910. The Herz timers, with roller and wipe contacts, the new steel-shoed contact, and various other designs are taken up in detail, not only giving the prices of the completed devices, but also illustrating and rating every part. This feature alone would make the booklet especially valuable to designers and engineers, as well as to owners and supply dealers. The distributor, coils, and Herz Bougie Mercedes spark plugs are described at length, as are also the Herz importations of ignition cables and wires, battery connections and terminals, switches and copper-asbestos gaskets. The Herz Company is making a specialty of its air pumps for use in inflating tires, in self-starting devices, for whistles on boats, and many other places where compressed air is needed. Two types are driven by friction from the flywheel or other moving part, one of which is kept in contact with the driving part by a spring, and is bolted to the frame or some other convenient member, while the other is held against the revolving wheel or shaft by a handle, and is portable. In both of these the pistons and cylinders are of gray cast iron, with piston rings of the same material, no leather being used. Between the pump driving friction wheels and the pistons are sets of speed reducing gears. Each pump is tested at 120 pounds pressure, and will run at high speed, so that the largest tire can be quickly inflated. The motor boat outfit includes a tank and whistle, and safety valve. The pump with the handle can be taken to any part of the auto or boat and when not in use, the handle can be removed and the entire device packed in a small space. Two mechanically-driven pumps are also catalogued and described. Herz magnetos and the Paternoster shock absorbers are taken up in detail, with instructions as to their application and maintenance.

American Locomotive Company, New York—Alco gasoline automobiles, now licensed under the Selden patents, are ably described in a handsome catalogue just issued by the makers, the American Locomotive Company of New York and Chicago. These cars are the successors of the American Berliet, and continue in their construction the finesse of details and ability that characterized the Americanized French product. On heavy calendered paper, with clear and comprehensive cuts and text, the new edition of the Alco book is one of the finest seen, in regard to the 1909 automobiles. Detail illustrations give an idea of the type of the cars produced, a four-cylinder and a six-cylinder chassis being shown, the latter from above. Separate cuts of the two engines, transmission with its double bevel drive employing direct drive on both third and fourth speeds, transmission dissembled, multiple disc clutch, rear wheel assembly, are given. The body designs are shown by four illustrations of completed cars, two for touring and two enclosed. A rear view and details of the tonneau and front seat with control system are added. The text is of more interest to the casual reader than is often found in such booklets, giving the details of construction in a very pleasing and instructive manner, and at the same time convincingly showing the advantages of the types adopted for the Alco cars. Features are given as sturdiness, balance, anti-fatigue metal, and long life. Inasmuch as the 40 and 60-horsepower cars are the leaders in the line they are treated in greater length than is the 32-horsepower model, such as is used in the town cars and taxicabs, although frequent reference is made to the latter when its style is especially similar to that of the larger ones.

Locomobile Company of America, Bridgeport, Conn.—The latest publication of the Locomobile Company deals with the 1909 product. This is the eleventh annual catalogue and describes the new shaft drive and other models. Following a few pages of general text comes a very complete description of the mechanical details. These are not general and vague, but specific and to the point. Besides the subject matter, dealing with the parts, the illustrations, about evenly divided as to photos and line-cuts, are very well selected. The scope of this treatment may be judged from the bare statement that almost four full pages, 9 by 12 in size, are devoted to the engine. The new shaft drive construction is elaborated upon to the extent of three pages. As this illustrates a new principle, and one that is worthy of study, the space is well used for that purpose. In this design all torsional stresses have been removed from the rear axle. The result is a stronger construction and one that rides easier. Naturally it is also productive of longer life, a point worth considering when purchasing. An interesting portion of the rear end of the book deals with the Fairmount Park races in Philadelphia during Founders Week. The road race at that time was won by the Locomobile entry, and a series of excellent pictures of the race are given. Some space is devoted to the Vanderbilt Cup race, also won by Locomobile.

Jewell Motor Car Company, Massillon, O.—Descriptive of the 1909 models of Jewell automobiles, the new catalogue is a beautifully compiled book of 32 pages, dealing with the entire construction of the regular 40-horsepower touring cars, limousine and roadster, and the Jewell-Keeton city and suburban car. The photographs and general make-up of the catalogue is in keeping with the "beauty and elegance of finish" which it attributes to the product of the concern. This is the third year of Jewell 40's, and little change has been made in the power plant and operating parts. The 1909 touring car is built with extra seats, making its capacity seven; the roadster can be equipped with either single or double rumble or bucket seats, and the limousine is designed to compare favorably with the finest output of other concerns. The engine, transmission, clutch, axles and other appliances are illustrated and explained in the book. The Jewell-Keeton car is one built along European lines, with thermo-syphon cooling, the radiator back of the engine forming a part of the dash, fixed spark advance and developing 24-30 horsepower.

S. F. Bowser & Company, Inc., Ft. Wayne, Ind.—Gasoline storage outfits of numerous sizes and types, lubricating oil wells, etc., are well described and illustrated in a catalogue received from S. F. Bowser & Company. From an illustration on the cover, which is said to be drawn "to arrest the attention" of a reader to the ten reasons for the installation of Bowser outfits, the book is of interest. Garage proprietors, owners of private garages, and prospective builders will find the booklet of extra use. A great many cities require that the gasoline shall be kept under ground, and where this is not so, the fact of economy in space and gasoline itself are commendable reasons for the use of such systems. Five distinct sets are illustrated and described in the Bowser book, any of which can be employed to store gasoline or kerosene, or both in separate tanks. Three types of oil tanks are mentioned, and an illustration given of an outfit in a private garage where the gasoline, kerosene, and two grades of lubricating oil are kept out of sight, and only the pumps enter the building.

Barrett Manufacturing Company—An attractive catalogue dealing with Tarvia for roads has been issued by the Barrett Manufacturing Company, beautifully illustrated with scenes from several parts of the country. The book is entitled "How to Construct and Preserve Macadam Roads and Prevent Dust," considering in turn the action of automobiles upon roads and the need for some better surfacing material, the endorsement of the tar treatment, and then Tarvia "A," "B," and "X." Experiences of prominent road engineers and supervisors are cited, and letters from a number are included. The photographs of roads treated with Tarvia products are highly interesting, not only from the standpoint of the Barrett interests, but also for their scenery. They have been well chosen from the possible many, giving views of good Pennsylvania roads in the suburbs of Philadelphia, those in the outskirts of Boston, in New Jersey, Iowa, Nebraska, and many other places.

Diamond Rubber Company, Akron, O.—"Ten Years in the Ascendency" is the title given to the sixth edition of the Diamond tire book just issued. The booklet combines the features of a catalogue with a source of much valued information upon tires in general and Diamonds in particular. It is strikingly bound in blue, with a copy of the engraving which caused so much favorable comment during the shows, when used as a Diamond advertisement, that of the title on the cover. The typography is excellent and the cuts distinct in order to illustrate the features of treads and rims. Various types of Diamond tires are discussed, wrapped tread, non-skid, Bailey tread, and tubes; and of rims there are several—standard clincher, Fisk bolted-on, Marsh, and demountable, with instructions for changing tires. A set of "don'ts" and of "do's" is of interest to the owner of an automobile. This feature makes the book one of instruction and additional value.

New York & New Jersey Lubricant Company, New York—"A Cylinder Oil with a Pedigree" is the title of an attractive little booklet issued by the New York & New Jersey Lubricant Company on its new cylinder lubricant, "MoToRoL." The presentation of the cylinder oil subject assumes a new tone in this "MoToRoL" booklet, and the printing embellishments are unique. Basing argument on the fact that too often cylinder oil is selected at haphazard, or on the strength of some popular fallacy, the suggestion is offered that the reputation of the manufacturer is a safer basis for choosing a lubricant. "Non-Fluid" oils for the lubrication of transmissions and bearings in automobiles are well known, and their adoption by many automobile manufacturers is offered as warranty for confidence in the new production. The booklet states that "MoToRoL" is as effective for cylinders as "Non-Fluid" oils for transmissions.

Joseph Dixon Crucible Company, Jersey City, N. J.—What might be called a pocket edition general catalogue has been issued by the Joseph Dixon Crucible Company. This lists the principal products, such as crucibles, facings, lubricating graphite, greases, pencils, protective paints, etc., giving brief descriptions and prices. It is of value to the purchasing agent, engineer, contractor, superintendent, and anyone who uses or specifies graphite in any form. The booklet is of commercial envelope size, and will conveniently go in the pocket or desk pigeonhole. It is substantially bound in tough cover stock, and attractively printed. Copies may be obtained from the Dixon Company.

Schacht Manufacturing Company, Cincinnati—A book recently published by this house gives a number of good pointers on the kind of an automobile to buy so as to get the greatest amount of satisfaction. A few of the subjects covered are trips to town, markets, neighbors, doctor, saving one-third of your time, healthful recreation, low first cost, run on less cost that feed for horses, always in the barn, ready day or night, get you there and back again. Just send your name and the manufacturers will send you this book free. The address is the Schacht Manufacturing Company, 2721 Spring Grove avenue, Cincinnati.

Morrison-Ricker Company, Grinnell, Iowa—The Morrison-Ricker Manufacturing Company of Grinnell, Iowa, has issued a new catalogue of its complete line of automobile gloves. The cover design is unique, artistic, and original; the colors striking and attractive. Everyone interested in auto gloves, whether dealers or wearers, are invited to send for a copy. "A glove to suit every requirement, every taste, and every season," is the announced aim of the manufacturers of Grinnell gloves.

General Automobile Supply Company, New York—J. C. Nichols, president of the General Automobile Supply Company, Inc., has issued the 1909 catalogue of automobile accessories and supplies. In it are described and listed almost anything an automobilist can think of with which to equip his car. Lamps, speedometers, coils, magnetos, oilers, oil cans, pumps, oils and greases, tires, tools, etc., are all mentioned with the General Company's rates. A mail order business is being carried on.

The Waverley Company, Indianapolis, Ind.—Bridge whist and Waverley electric automobiles are united in the latest publication of the Waverley Company. This is a bridge whist score book, and on each page is a cut of one type of Waverley with some hints on playing the game, and then as applied to the operation of the cars, from the opening lead to the return triumphant. These score books may be had upon application.

Information for Auto Users

Hill Folding Seat—As the demand for large cars of roomy capacity continues there is an equally strong demand for a suitable folding seat for the tonneau by owners who do not have the additional seats, although their cars are large enough for them. This great demand has induced a number of coach and body builders to bring out a seat for this purpose. Chief among these the product of the Hill Manufacturing Company, Buffalo, N. Y., is remarkable for its simple construction and the ability to fold to a very small size. The back folds down onto the seat, which then turns up into a plane at right angles to the floor of the tonneau. More than this, the whole folded seat may be swung around

READY FOR USE. FOLDED UP.
HILL FOLDING TONNEAU SEAT.

so that it comes still closer to the sides. The application is very easy, consisting of fastening two blocks, one to the floor and one to the side frame, so as to form an exact right angle. To these two blocks the attachment requires but seven screws. The seat is trimmed in genuine machine-buffed leather over spring cushions. The form is that of a circle, 13 inches in diameter. The folding back is 17 inches high. The picture shows, besides the seat open and folded, an extra set of seat attaching irons.

Oilzum Automobile Oils—Of all the different petroleum produced the world over, the purity of a home product is the best. This is the Pennsylvania patroleum which is, on account of its purity, more expensive than other less pure products. In the production of a high-grade cylinder oil, the White & Bagley Company, Worcester, Mass., manufacturers of Oilzum cylinder oil, found that this was the only product pure enough for their use, despite the price. This use results in a pure mineral oil, containing no animal or vegetable matter, both of which are liable to decomposition and the formation of destructive acids, the effect of these upon cylinder walls being self-evident. One very desirable point in connection with the subject of lubrication, is a high flash point, and what usually goes with it, a high fire test. As might be expected from the resultant of high-class raw material, and a high-grade process. Oilzum possesses both of these requisites.

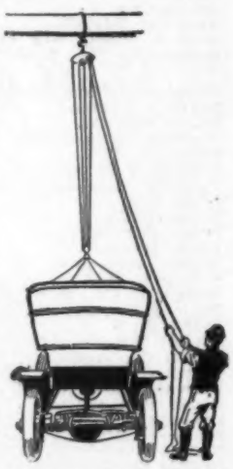
Ordinary oils contain some carbon; in some this has been concealed by bleaching with acids; the best and most trustworthy way is by continuous filtration. This method is very costly but the resulting oil is good and worthy of the very best use, such as for cylinders. It is interesting to note that filtration is the only method which has ever been used in the preparation of Oilzum oils. This filtration sounds simple, but in practice it means passing the oil through graded Fuller's earth, not once nor twice, but times without number, at least up to a dozen or twenty.

Auto Type Ampere Meter—One of the greatest drawbacks of the storage cell for ignition purposes is the necessity for charging at frequent intervals. This is liable to come at a time when the use of the car is particularly to be desired, and any device which would prevent that from happening would go far toward increasing the popularity of the storage battery. A little meter just put on the market by the Sangamo Electric Company, Springfield, Ill., will go far in this direction. This is a small enough device to allow of its use on the dashboard, so that any one may attach it, after which the very beneficial use for which it is intended would be self-evident. It is also made in sizes sufficient for use with electric vehicles, for which it was brought out primarily. With one of these meters on the car it is impossible to get stuck out on the road, with the consequent chagrin attendant upon being towed home.

SANGAMO AMPERE HOUR ELECTRIC METER.

The illustration shows the meter with the cover removed, displaying the mechanism. The cover is simply a square box of metal, which fits rather closely over the mechanical parts, being held on by the two studs shown projecting from the back of the frame. The one shown is for a 60-ampere hour battery, but they may be had for any capacity.

Burr Self-Locking Block—One of the handiest things around a garage, using any form of block and tackle to lift cars or other heavy objects, is the Burr automatic safety tackle block, made by the Burr Manufacturing Company, Cleveland, O. This has a locking device, which comes into play as soon as a load is placed upon it, thus allowing of hoisting a car or weight off of the floor and leaving it suspended, without tying the rope or resorting to other and similar questionable means of fastening it. This distinctive Burr mechanism lets a person use the simple, cheap, and easily obtained hemp rope, instead of the more expensive steel cable. The Burr safety lift is made of the best selected steel, and has no teeth, wedges, eccentrics or springs to get out of order. Moreover, it works under any and all conditions, on wet or greasy rope, and at any angle, even when inverted.



BURR AUTOMATIC BLOCK

The probable greatest field of usefulness for this block lies in the private garage, where the expensive chain block or more expensive duplex hoist represent an expense out of all proportion to the rest of the outfit. Yet a hoist of some sort is a real necessity, so that the safety lift will find a niche into which it will fit very nicely midway between the plain rope hoist, with very apparent disadvantages, and the expense of the more mechanical devices.

Elba Lighting Battery—There is at present a strong tendency toward the use of electric lights for automobiles and motor boats, and this tendency is being given proper support by the ignition specialists by the production of a battery especially designed and built for lighting work. The convenience and cleanliness of this method is daily attracting more recruits and these should take warning that it is possible to overload a battery on a lighting circuit. The Willard Storage Battery Company, Cleveland, O., are among the first to bring out a lighting battery for lighting purposes, the Elba. While this resembles in external appearance the ordinary storage battery, its internal construction is such as to allow discharge at a much higher rate than is the usual case, and without injury. The Elba battery is rated at the regular Pullman car lighting rate.

ELBA BATTERY FOR ELECTRIC LIGHTING.

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